8 HYDROLOGY AND WATER QUALITY

The Hydrology and Water Quality chapter of the EIR describes existing drainage and water resources for the project site, and evaluates potential impacts of the proposed project with respect to flooding, surface water resources, and groundwater resources. Information for this chapter was primarily drawn from the *Preliminary Drainage Report for PlumpJack Squaw Valley Inn* prepared for the proposed project by the Gary Davis Group (see Appendix S),[1] the *Hydrogeologic and Groundwater Management Report Supplement No. 2* prepared by Holdrege & Kull (see Appendix T),[2] the *PlumpJack Dewatering Plan Review* prepared by HydroMetrics WRI (Appendix U),[3] the *Proposed PlumpJack Well Impact Evaluation* prepared by HydroMetrics (Appendix V),[4] and the *Hydrogeologic Peer Review of New and Revised Analyses of the Proposed PlumpJack Hotel, Squaw Valley, California*, prepared by O'Connor Environmental (Appendix W).[5] In addition, the chapter uses information from the *Placer County General Plan*[6], and associated EIR,[7] and the *1983 Squaw Valley General Plan and Land Use Ordinance*.[8] It should be noted that impacts associated with water supply and capacity are addressed in the Utilities chapter of this EIR.

8.1 EXISTING ENVIRONMENTAL SETTING

The following section describes the existing hydrological features of the project site and the surrounding region, as well as the water quality of the existing resources in and around the project site.

Regional Drainage

The project site is located approximately two miles west of State Route (SR) 89 at 1920 Squaw Valley Road, at the western end of Olympic Valley in Olympic Village, adjacent to the Squaw Valley Ski and Recreation Area in Placer County, California. The proposed project site is located

1 Gary Davis Group. *Preliminary Drainage Report for PlumpJack Squaw Valley Inn*. July 8, 2014. Revised October 17, 2014.
2 Holdrege & Kull. *Hydrogeologic and Groundwater Management Report Supplement No. 2.* February 12, 2016. Two previous versions of this report were produced by Holdrege & Kull but are not referenced here as primary documents due to the fact that much of the information included within the two previous versions has been superceded in Report Supplement No. 2. The original September 3, 2015 version and Supplement No. 1 version, dated December 1, 2015, are available for review at the Placer County Tahoe Office, 775 North Lake Boulevard, Tahoe City, CA 96145.
3 HydroMetrics WRI. *PlumpJack Dewatering Plan Review*. March 15, 2016.
4 HydroMetrics WRI. *Proposed PlumpJack Well Impact Evaluation*. March 11, 2016.
5 O'Connor Environmental, Inc. *Hydrogeologic Peer Review of New and Revised Analyses of the Proposed PlumpJack Hotel, Squaw Valley, California*. March 25, 2016.
6 Placer County. *Countywide General Plan Policy Document*. August 1994 (updated May 2013).
7 Placer County. *Countywide General Plan EIR*. July 1994.
8 Placer County. *1983 Squaw Valley General Plan and land Use Ordinance*. October 6, 1983.

within the low elevation portion of the Squaw Creek watershed, a tributary to the middle reach of the Truckee River (downstream of Lake Tahoe). The middle Truckee River flows northeast, terminating at Pyramid Lake, Nevada (a remnant of ancient Lake Lahontan).

The Squaw Creek watershed, the area of land where precipitation and its runoff is routed to Squaw Creek and its tributaries, extends to the mountain peaks above Olympic Valley to the north, west, and south. The total area of the watershed is 5,146 acres, and the Olympic Valley floor is 701 acres, which is 13 percent of the total watershed area.

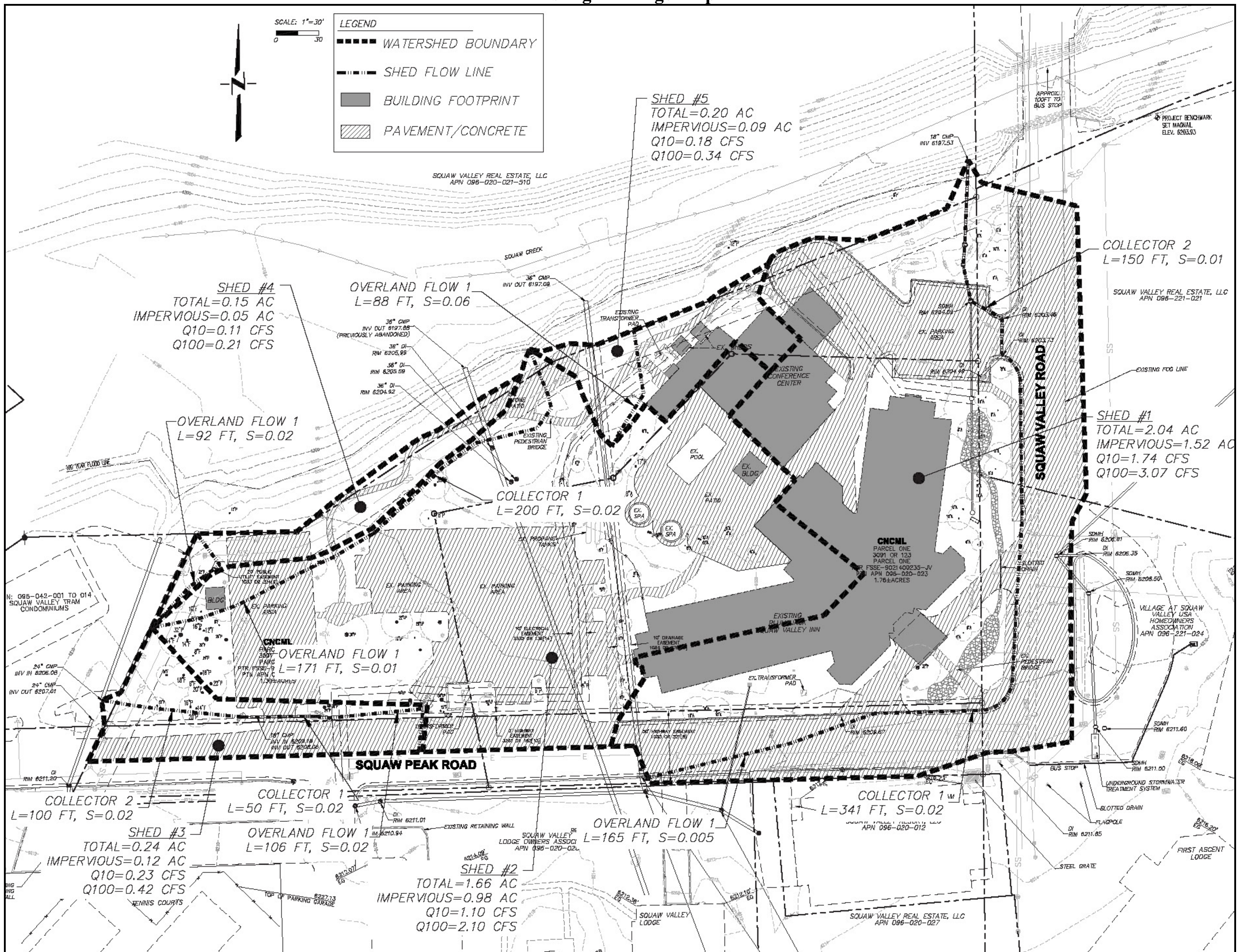
Local Drainage

The project site is on the south side of Squaw Creek at the foot of the Squaw Valley USA Ski Resort, and is at an approximate elevation of 6,210. For purposes of the project-specific drainage study, the existing overall project watershed of interest was subdivided into five drainage areas (see Figure 8-1). Figure 8-1 illustrates existing drainage conditions, including drainage acreage, impervious acreage, 10-year and 100-year peak flows, existing contours, existing site features, travel paths of flow, as well as flow path direction and type for each drainage sub-shed.

Ground surface slopes vary, but are generally towards the north in the direction of existing Squaw Creek and have a grade range throughout the project site from 0.5 percent to 50 percent. Buildings, asphalt, concrete, shrubs, rocks, wood chips, bare ground, grass turf, and patches of trees are the predominant existing surface types. Per USDA Web Soil Survey of Tahoe National Forest Area, the typical soil found on site is Tallac very gravelly sandy loam (TAE) which has a hydrologic soils group classification of A.[9] The existing imperious area for the project site includes the existing buildings, concrete patio/pool area, asphalt parking lots, and sidewalks. The project site includes an existing storm sewer system along with curb and gutter that conveys runoff east along a portion of Squaw Peak Road and north along Squaw Valley Road with the ultimate outfall into Squaw Creek. A portion of runoff on the west side of the site is collected and conveyed via road side swales and culverts to a larger off-site culvert that ultimately outfalls into Squaw Creek. The remainder of the project site is conveyed to Squaw Creek via swales and overland grading around the building and parking lots. An existing 36-inch corrugated metal pipe (CMP) storm pipe that cuts through the site from south to north and conveys off-site runoff to Squaw Creek. In addition, the project site includes an abandoned 36-inch storm pipe that also cuts through the site from south to north. The entire project site ultimately drains to existing Squaw Creek located to the north of the property. Most of the precipitation in the project area occurs between November and May in the form of snow. The area is typically dry during mid-summer through fall until the first rains or snow fall events.

[9] Gary Davis Group. *Preliminary Drainage Report for PlumpJack Squaw Valley Inn* [pg. 4]. July 8, 2014. Revised October 17, 2014.

Figure 8-1
Existing Drainage Map



Source: Gary Davis Group, 2014.

Surface Water Features

Squaw Creek and its tributaries are the only significant surface water bodies in Olympic Valley.[10] Two forks of Squaw Creek, the South Fork and Shirley Canyon, enter Olympic Valley along the western margin. Shirley Canyon is the larger of the two main forks of Squaw Creek.

The two main forks converge in an area locally known as the confluence, which is located northwest of the PlumpJack site (see Figure 8-2). The confluence is a wide gravel filled portion of Squaw Creek that has generally maintained its natural configuration. Water flows from the confluence into a manmade trapezoidal channel. The western end of the trapezoidal channel starts along the northeastern boundary of the PlumpJack project site. This channel is not lined, and runs generally parallel to Squaw Valley Road to the bridge on the eastern end of the Squaw Valley parking lot, to Papoose Bridge.

Below the bridge, Squaw Creek meanders through the meadow in a relatively natural channel. Squaw Creek exits the Valley beneath Squaw Valley Road Bridge on the eastern end of the meadow, and flows through an incised channel cut into the terminal moraine to the Truckee River.

Additional surface water tributaries to Squaw Creek include the Upwelling and overland flow sources. The Upwelling is a spring, located along the trace of Valley Fault 3. An ephemeral stream channel runs from the Upwelling to Squaw Creek, providing Squaw Creek with an additional water source in the meadow. Shallow groundwater along the northwestern portion of the meadow often flows to the surface, and flows overland in small rivulets into Squaw Creek.

The primary source of Squaw Creek's annual flow is snowmelt flowing in the South Fork and Shirley Canyon forks of Squaw Creek. This snowmelt peaks in spring, and may continue into early summer. After flow from snowmelt ends in summer, the confluence and trapezoidal channel rapidly dry up. Small amounts of water continue to flow in many parts of the meadow due to inflow from shallow groundwater.

Squaw Creek/Aquifer Interactions

Squaw Creek/aquifer interactions in West Olympic Valley[11] can be generally divided into three time frames: winter through early summer, mid-summer, and late summer through fall.

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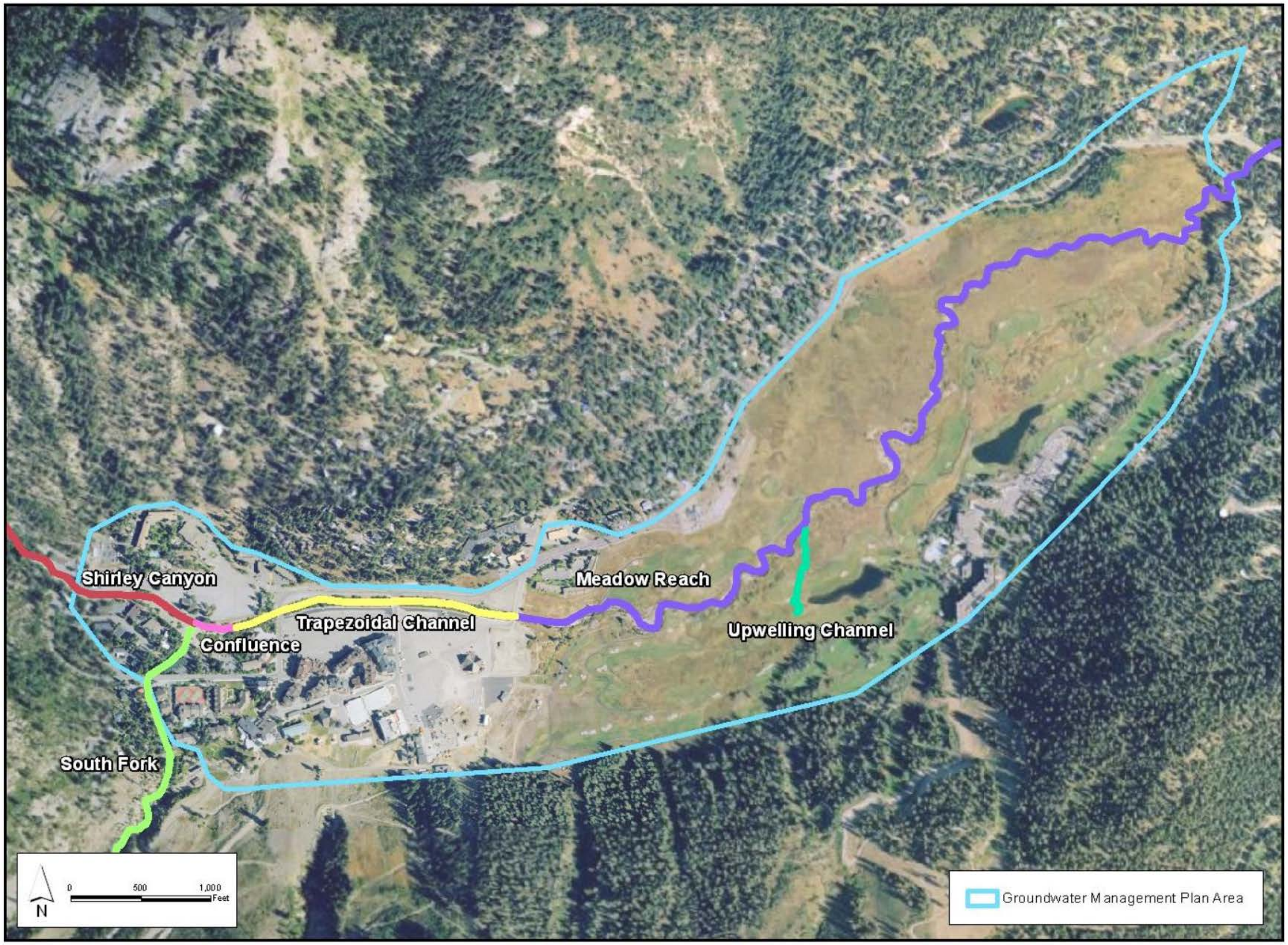
[10] HydroMetrics LLC. *Olympic Valley Groundwater Management Plan* [pg. 44]. May 2007.

[11] West Olympic Valley defined in the *Olympic Valley Creek/Aquifer Study Final Report* (pg. 33) as the area west of Papoose Bridge, which is at the far eastern end of the paved surface lot for the Village area. East Olympic Valley includes the meadow and golf course areas. Most groundwater pumped from this side of the Valley is for irrigation or private use. Unlike the trapezoidal channel, Squaw Creek meanders through this portion of the valley. The three distinct periods of creek/aquifer interaction observed in West Olympic Valley are not evidenced here. Squaw Creek generally gains water by draining the shallow aquifer along the entire length of the Creek in East Olympic Valley.

Figure 8-2
Squaw Creek Location and Reaches



Source: HydroMetrics LLC. Olympic Valley Creek/Aquifer Study Final Report. November 2014, Figure 2.

Winter through Early Summer Creek/Aquifer Interactions

The winter through early summer time period is characterized by relatively high flows in Squaw Creek. Squaw Creek may fill the trapezoidal channel from bank to bank, or may simply cover a significant portion of the creek bed. Squaw Creek is fed by rainfall and snowmelt during the winter through early summer period, and groundwater levels in West Olympic Valley are high; generally at or above the elevation of the creek bed.

Water pumped by municipal wells during this period intercepts groundwater that might otherwise flow to the trapezoidal channel. However, municipal pumping directly removes little or no water from the trapezoidal channel, which is supported by the facts that the trapezoidal channel is gaining water, rather than losing water, during this period.

The conceptual model of water flow in West Olympic Valley during spring and early summer starts with groundwater recharging the aquifer along the basin margins. This groundwater flows both from west to east towards the meadow, and towards the trapezoidal channel from both north and south edges of the basin. The trapezoidal channel drains the shallow aquifer along both its north and south banks, although more water appears to flow into the trapezoidal channel from the north bank, which is likely due to municipal pumping south of the trapezoidal channel. Wells intercept some of the basin recharge that would otherwise discharge to the trapezoidal channel. The amount of water intercepted by the wells is small compared to the flow in the trapezoidal channel. The majority of flow in the trapezoidal channel, and in Squaw Creek, is derived from snowmelt and rainfall.

Mid-Summer Creek/Aquifer Interactions

The mid-summer period is characterized by relatively low Creek flows, and represents the very end of the annual snowmelt. At the end of the mid-summer period, snowmelt ceases and surface water flows cease to feed the two western branches of Squaw Creek. The mid-summer period likely lasts between a few weeks and a month.

During this time period, the trapezoidal channel goes from generally gaining water to generally losing water. Similarly, municipal wells in West Olympic Valley go from intercepting water before the water reaches the trapezoidal channel, to drawing water out of the trapezoidal channel. The amount of water drawn from the trapezoidal channel is a small percentage of the total pumping. As flows in Squaw Creek decline, however, the small amount of capture represents a greater and greater percentage of the total Creek flow.

During the mid-summer period, snowmelt continues to provide recharge along the basin boundaries and provide the primary source of streamflows entering the basin. Although the trapezoidal channel loses water to the aquifer in the mid-summer time period, most recharge appears to come from snowmelt along the edges of the basin. The recharge from ongoing snowmelt and creek leakage props up groundwater elevations to just below the base of Squaw Creek.

Late Summer through Fall Creek/Aquifer Interactions

The late summer through fall time period is characterized by no streamflow in the trapezoidal channel. Snowmelt has ceased and other significant rainfall supplying water to Squaw Creek does not occur. Historical photographs show that the late summer through fall period of no streamflow occurred before any significant development of Olympic Valley. Lack of streamflow in western Olympic Valley is therefore not caused by municipal pumping, although its onset may be hastened by pumping. Because flow does not exist in the trapezoidal channel, and groundwater levels are below the bottom of Squaw Creek, Creek/Aquifer interaction does not occur in western Olympic Valley during the late summer through fall time period.

Groundwater is pumped from aquifer storage during the late summer through fall time period, which causes groundwater levels to drop more rapidly than during either of the previous two time periods. Isotope data suggest that water pumped later in this period is older: up to 4 to 6 years old. The pumped groundwater is derived from longer flow paths, and possibly some fracture flow feeding the edges of the basin.

The end of the late summer through fall period is marked by the return of precipitation. Groundwater elevations rebound quickly after the first rainfalls. Groundwater elevations can rebound to near-full basin conditions within days. Runoff from early rainfall events feeds Squaw Creek. As Squaw Creek begins to flow and groundwater levels rise rapidly, the Creek/aquifer dynamic changes rapidly. Immediately following the first large rainfall, groundwater elevations are still below the Creek bed, and the trapezoidal channel loses water to the shallow aquifer. This dynamic is reversed within a matter of days. Groundwater elevations quickly rise above the level of Squaw Creek, and the creek changes from a losing creek to a gaining creek. Within days after the first major storm, the trapezoidal channel is again draining the shallow aquifer.

Groundwater

Olympic Valley Groundwater Basin

Groundwater produced from the alluvial aquifer beneath the Olympic Valley has been the primary source of water supply in the area since the development of Squaw Valley. The alluvial aquifer underlying Olympic Valley is the Olympic Valley Groundwater Basin, designated by DWR as Groundwater Basin Number 6-108.

In general, the western portion of the Olympic Valley Groundwater Basin is more coarse-grained than the eastern portion of the Basin. Previously completed investigations have categorized geologic material in the Olympic Valley into three units with similar hydrogeologic characteristics.[12]

> **Hydrogeologic Unit 1** – This unit is generally limited to the upper five to twenty feet of the Basin and is composed of fine sands and silts in the western portion of Olympic

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[12] Todd Groundwater. *Updated Sufficiency of Supply Assessment for Village at Squaw Valley and Other Growth, Squaw Valley California* [pg. 3]. July 21, 2015.

Valley, with increasing fine-grained material (clay, silt, and peaty organics) towards the east.

Hydrogeologic Unit 2 – This is the primary water bearing material in the Basin. The material is composed of gravels and sands, with silt and clay content increasing to the east. The depth and thickness of the material varies widely throughout the Basin, with the thickest and deepest portion in the west where the existing SVPSD and SVMWC production wells are located. The second hydrogeologic unit was measured to be approximately 133 feet deep in the PlumpJack Deep Well located in the western portion of the project site.

Hydrogeologic Unit 3 – This unit is present primarily in the eastern portion of the Basin and is composed of fine-grained material with occasional sand and gravel. This unit has limited production capacity and the water in it could be of low quality.

The unconsolidated sediments in all three of the Hydrogeologic Units were deposited primarily by glacial, lacustrine, and fluvial processes. Groundwater is present in each of the units where they exist throughout the Basin, but their relative ability to store and transmit water varies. Generally, the materials in the western portion of the Basin have a larger capacity for water supply production than those in the east. As a result, all the existing municipal water supply wells are located in this area. The units are underlain by igneous bedrock with no primary porosity, meaning that its water holding capacity is from fractures.

Recharge to the Basin occurs from infiltration of precipitation on the valley floor, overland flow from the mountainsides surrounding the valley, mountainfront recharge in the higher elevation sediments on the edges of the Basin, and infiltration from Squaw Creek. In the western portion of the Basin, most of the water produced by the municipal supply wells comes from mountainfront recharge occurring just above the valley floor in shallow aquifer materials along the edge of the groundwater basin. This source of recharge occurs during precipitation and snowmelt, so the volume and timing of this source of water to the Basin is dependent on these factors.

Historical records of groundwater elevations in monitoring and production wells show that water levels peak near the same elevations in normal and wet years. The elevation of the peaks is generally near ground surface, which suggests that during most years, ample recharge is available to fill the sediments to a maximum level; above this level, recharge is rejected because the Basin is nearly completely or locally full. Rejected recharge either flows overland to Squaw Creek or is quickly drained from the shallow portion of the Basin by Squaw Creek.[13] This phenomenon of *rejected recharge* is due to the much larger volume of potential recharge water (precipitation and snowmelt) that flows through the valley on an annual basis relative to available storage capacity in the Basin.

One of the most distinguishing characteristics of the Basin is the pattern of winter and spring groundwater elevations at or near historical highs year after year regardless of hydrologic

[13] HydroMetrics LLC. *Olympic Valley Groundwater Management Plan* [pg. 29]. May 2007.

conditions.[14] Observations of historical groundwater elevations and production in the valley and results of modeled conditions show that the Basin generally fills to the same levels every year in the winter and spring months. Even in dry years when groundwater elevations sometimes fall to relatively low levels in the late summer and fall, they generally recover to high elevations in the winter and spring regardless of whether the area is experiencing average, wet, or dry hydrologic conditions. This is another example of rejected recharge in the Basin. In such cases, the relationship between potential recharge volume and available groundwater capacity implies that additional groundwater production-related water level declines would not cause year-on-year reductions in groundwater elevations or availability, but would instead induce increased recharge to the Basin. The same groundwater elevation patterns also show that the late summer and fall months are the times when water levels are lowest and groundwater supply availability is potentially limited.

Fractured Bedrock Groundwater

Groundwater is found in fractures in the crystalline rocks surrounding the Basin. A major portion of the recharge to the Basin comes from mountain front recharge. A significant component of water from fractured bedrock sources does not occur in the western portion of the Olympic Valley Groundwater Basin, which implies that a strong connection between fractured bedrock groundwater does not occur in the mountains above the Basin and the Olympic Valley Groundwater Basin.

The SVPSD and SVMWC have active horizontal wells that draw from fractures in the hillsides above Olympic Valley to both the north and the south. These wells are located in fractured bedrock, and not the alluvial Olympic Valley Groundwater Basin. Horizontal wells are not equipped with pumps. Instead, water that enters the well is drained out of the opening by gravity. Therefore, the quantity of water produced by a horizontal well is generally considered constant from year to year, unless the capacity of the fractures connected to the well is reduced.

Groundwater Underlying the Project Site

Based on groundwater level monitoring in the Shallow Plumpjack Monitoring Well, groundwater levels appear to seasonally fluctuate between about 6,197 feet in the winter and spring to about 6,190 or lower in the summer and fall. The groundwater level fluctuates rapidly with changes in flow of Squaw Creek and fall precipitation. The bottom of the Squaw Creek stream channel is located at an elevation of about 6,192 feet or about 18 feet below existing site grades. During high flow or flood events, the channel contains over six feet of water; and the assumed high groundwater level of 6,200 feet appears possible at the project site. However, the assumed high groundwater level is associated with flood or high runoff events that occur with frequencies measured on the order of years and are for limited periods of time.[15]

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[14] Todd Groundwater. *Updated Sufficiency of Supply Assessment for Village at Squaw Valley and Other Growth* [pg. 13]. July 21, 2015.
[15] Holdrege & Kull. *Hydrogeologic and Groundwater Management Report* [pg. 8]. September 3, 2015.

Water Quality

The primary responsibility for the protection of water quality in California rests with the State Water Resources Control Board (State Board) and nine Regional Water Quality Control Boards. The State Board sets statewide policy for the implementation of state and federal laws and regulations. The Regional Boards adopt and implement Water Quality Control Plans (Basin Plans), which recognize regional differences in natural water quality, actual and potential beneficial uses, and water quality problems associated with human activities.

The project site is within the jurisdiction of the Lahontan Regional Water Quality Control Board (Lahontan RWQCB), which extends from the Oregon border to the northern Mojave Desert and includes all of California east of the Sierra Nevada crest. The name of the Region is derived from prehistoric Lake Lahontan, which once covered much of the State of Nevada. Most of the waters of the North Lahontan Basin drain into closed basins which were previously part of Lake Lahontan. Waters of the South Lahontan Basin also drain into closed basin remnants of prehistoric lakes.

Surface Water

According to the Basin Plan for the Lahontan Region, the project site is located within the Truckee River Hydrologic Unit. The Basin Plan sets water quality objectives for certain surface water bodies in the Truckee River Hydrologic Unit, including the mouth of Squaw Creek, which also applies to the upstream segment of Squaw Creek, including the reach along the project site's northern boundary.[16] The objectives are listed in Table 8-1 below.

Table 8-1
Water Quality Objectives for the Mouth of Squaw Creek
Truckee River Hydrologic Unit

Surface Waters	Objective (mg/L)[1,2]								
	TDS	**CI**	**SO_4**	**P**	**B**	**NO_3-N**	**N**	**TKN**	**Fe**
Squaw Creek at Mouth	85	3.0	25.0	0.02	--	0.05	0.18	0.13	0.13

[1] Values shown are mean of monthly mean for the period of record.
[2] Objectives are in units of mg/L and are defined as follows:

TDS	Total Dissolved Solids (Total Filterable Residue)
CI	Chloride
SO_4	Sulfate
P	Phosphorus, Total
B	Boron
NO_3-N	Nitrate as Nitrogen
N	Nitrogen, Total
TKN	Total Kjeldahl Nitrogen
Fe	Iron, Total

Source: Lahontan RWQCB. Water Quality Control Plan for the Lahontan Region [Table 3-11, Row 8], September 10, 2015.

[16] Lahontan Regional Water Quality Control Board. *Water Quality Control Plan for the Lahontan Region* [Table 3-11, pg. 3-33]. September 10, 2015.

Objectives specific to the mouth of Squaw Creek pertain to total dissolved solids (TDS), Chloride, Iron, Nitrogen, Nitrate as Nitrogen, Phosphorus, and Sulfate. The Basin Plan also establishes water quality objectives that apply to all surface waters, such as ammonia, bacteria (coliform), biostimulatory substances, chemical constituents, chlorine (total residual), color, dissolved oxygen, floating materials, oil and grease, nondegradation of aquatic communities and populations, pH, radioactivity, sediment, settleable materials, suspended materials, taste and odor, temperature, toxicity, and turbidity. Pages 3-3 to 3-6 of Chapter 3 of the Basin Plan provide the technical water quality objective information pertaining to all surface waters; and this technical material is hereby incorporated by reference, pursuant to CEQA Guidelines Section 15150. The water quality objectives are established for conformity with the federal Clean Water Act (CWA). The levels at which the objectives are set take into account both designated beneficial uses, discussed in Chapter 2 of the Basin Plan, as well as environmental considerations specific to each hydrologic unit.

The Basin Plan identifies the following beneficial uses of Squaw Creek: municipal and domestic water supply (MUD), agricultural supply (AGR), groundwater recharge (GWR), water contact recreation (REC-1), non-contact water recreation (REC-2), commercial and sportfishing (COMM), cold freshwater habitat (COLD), wildlife habitat (WILD), rare, threatened, or endangered species (RARE), migration of aquatic organisms (MIGR), and spawning, reproduction, and development (SPWN).[17]

Squaw Creek does not currently meet the Basin Plan's water quality objective for sediment. Section 303(d) of the federal CWA requires states to identify surface water bodies that do not meet water quality standards. These waters are placed on the Section 303(d) List of impaired water bodies. The List identifies the pollutant(s) causing impairment and establishes a schedule for developing a control plan. Listed water body-pollutant combinations are generally addressed through pollutant control plans called Total Maximum Daily Loads (TMDLs). The current Section 303(d) List for California, including the Lahontan Region, is the 2010 List. According to the Final California 2010 Integrated Report (CWA Section 303(d) List/305(b) Report), Squaw Creek is only impaired for Sedimentation/Siltation.[18] The sediment pollutant control plan/TMDL was adopted for Squaw Creek by the RWQCB in 2006 and approved by the USEPA in 2007.

The purpose of the Squaw Creek Total Maximum Daily Load (TMDL) is to ensure attainment of all sediment related water quality standards, including narrative objectives related to protection of in-stream beneficial uses. More specifically, the focus of this TMDL is beneficial uses related to aquatic life and recreational activities (COLD, SPWN, REC-1, REC-2, WILD, MIGR, and COMM), and water quality objectives for sediment, settleable materials, suspended sediment, turbidity and nondegradation.

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[17] Lahontan Regional Water Quality Control Board. *Water Quality Control Plan for the Lahontan Region* [Table 2-1, pg. 2-14]. September 10, 2015.

[18] California Environmental Protection Agency, State Water Resources Control Board. *Impaired Water Bodies*. Available at: http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml?wbid=CAR6352001119980805095744. Accessed March 2016.

TMDL Targets for Squaw Creek

The CWA Section 303(d)(1)(C) states that TMDLs "… shall be established at a level necessary to implement the applicable water quality standards." Water quality standards include the designated beneficial uses of waters and the water quality objectives established to protect beneficial uses. Because the applicable water quality objectives for the Squaw Creek TMDL are narrative, rather than numeric, indicators and associated target values were developed to assess attainment of narrative sediment-related water quality objectives and ensure protection of aquatic life beneficial uses.

Numeric targets were developed for Squaw Creek based on bioassessment work conducted throughout the Truckee River watershed in 2000 and 2001. Progress toward meeting the TMDL is determined through monitoring of the in-stream physical and biological parameters identified in the numeric targets and tracking compliance with existing and proposed regulatory actions. The monitoring and reporting programs for existing permits require monitoring of the numeric targets, and any new permits for ongoing stormwater, sediment and erosion management would incorporate the monitoring parameters as well. Monitoring and reporting requirements provide the mechanism for the Water Board, dischargers, and public to determine if the Implementation plan is achieving the TMDL, or if other actions are required. A summary of the numeric targets is presented in Table 8-2.

Table 8-2
Indicators and Targets for Squaw Creek TMDL

Indicator	Target Value	Notes
Biological Health: Biological Condition Score, calculated from Index of Biologic Integrity.	Biologic condition score of 25 or more when stream flows are continuous. Applies to the meadow reach of Squaw Creek.	Represents desired biologic integrity of stream protective aquatic life uses. Target value based on regional reference stream biologic conditions.
Physical Habitat: D-50 Particle Size	Increasing trend in D-50 value approaching 40 millimeters (mm) or greater. Applies to the meadow reach of Squaw Creek.	Represents desired substrate conditions for aquatic life. Target value based on regional reference stream substrate conditions.
Physical Habitat: Percent Fines and Sand	Decreasing trend in percent fines and sand value approaching 25% cover of the stream bottom or less. Applies to the meadow reach of Squaw Creek.	Represents desired substrate conditions for aquatic life. Target value based on regional reference stream substrate conditions.

Source: Lahontan RWQCB, Squaw Creek TMDL Implementation Status Report, October 16, 2015.

The numeric targets listed in Table 8-2 are described in the following section.

Biological Health Numeric Target

Biologic Condition Score

The biologic condition score is a numeric value based on an index of seven biologic metrics that are sensitive to changes in biological integrity caused by sedimentation, as discussed previously in this section. The assessment of the biologic condition of aquatic communities is important to determine how well a water body supports aquatic life (USEPA, 2002).

Numeric target

Biological condition score of 25 or greater in the meadow reach when flow is continuous. The target shall be evaluated as a rolling average of three consecutive sampling events conducted once every two years. The numeric value of 25 represents reasonably achievable desired conditions for benthic aquatic life that are protective of beneficial uses related to COLD and SPWN.

Physical Habitat Numeric Targets

D-50 Particle Size

D-50 particle size is a statistical measure of the central tendency of the particle size distribution of the stream channel substrate. For example, a D-50 of 30 means that 50 percent of the stream's substrate is composed of particles greater than 30 millimeters (mm) in diameter, and 50 percent is less than 30 mm. As coarser substrate particles become more abundant, the D-50 values increase.

Particle size distribution is an important indicator of habitat suitability for aquatic life. Excessive fine particles deposited on the streambed can be detrimental to fish and invertebrates by increasing embeddedness of gravels and decreasing interstitial spaces, leading to changes in species composition and diversity (Waters, 1995). Clean cobbles and gravels are needed to provide suitable spawning conditions and habitat diversity. Conditions in low gradient reference streams showed D-50 values generally equal to or greater than 40 mm; therefore, 40 mm is selected as the target to represent satisfactory conditions for aquatic life support. This indicator relates to the COLD and SPWN beneficial uses.

Numeric target

Increasing trend in D-50 value approaching at least 40 mm (geometric mean) in the meadow reach.

Percent fines and sand

For the purpose of the TMDL, fines and sand are defined as mineral substrate less than 3 mm in diameter. As presented in the discussion for the D-50 target, both the amount and size of fine and coarse particles impact aquatic life. Channel substrates in reference streams showed fines and sand values of generally less than 25 percent; therefore, this value was selected as the target to represent satisfactory conditions for aquatic life support. This indicator relates to the COLD and SPWN beneficial uses.

Numeric target

Decreasing trend in percent fines and sand approaching 25 percent within the meadow reach.

Squaw Creek Sedimentation Sources

The TMDL for Squaw Creek includes a source analysis to identify and estimate the relative magnitudes of sediment sources to Squaw Creek, and to demonstrate that all major sediment sources have been considered in establishing load reductions to meet the numeric targets. The source analysis focuses on sources of sediment from land disturbance categories rather than individual land managers or dischargers. Table 8-3 shows the percent total of total sediment load by source category.

Table 8-3
Sediment Delivery Estimates, Squaw Creek Watershed

Sediment Source Category	Total Sediment Delivery by Source Category (tons/year)[1]	Percent of Total by Source Category
Dirt Roads	9,300	25%
Major Dirt Road Cuts	900	2%
Road Traction Sand	300	1%
Residential/Commercial Areas	200	1%
Graded Ski Runs	9,000	24%
Alluvial Channel Erosion	4,300	11%
Undisturbed Areas	14,000	37%
Uncontrollable Sources[2]	*16,100*	*42%*
Controllable Sources	*21,800*	*58%*
Total Annual Sediment Delivery[3]	**37,900**	**100%**

[1] Rounded to nearest 100 tons.
[2] This is considered the best estimate of current naturally occurring sediment delivery. The estimate shown includes 50 percent (rounded to 2,100 tons/year) of the annual channel bank contribution and 100 percent (14,00 tons/year) of sediment delivery from undisturbed areas.
[3] This estimate adds to the 37,900 tons/year because the alluvial channel erosion estimate was distributed equally between the “controllable” and “uncontrollable” sediment source categories. The estimate of one-half of 4,300 tons/year (2,150 tons/year) was rounded down to 2,100 tons/year.

Source: Lahontan RWQCB, Squaw Creek TMDL Implementation Status Report, October 16, 2015.

The source analysis conducted as part of the Squaw Creek TMDL indicates that approximately 60 percent of the sedimentation affecting Squaw Creek is related to disturbance brought on by human activities and approximately 40 percent is attributed to naturally occurring erosion.

Squaw Creek Loading Capacity and Load Allocations

Loading capacity is defined as the maximum amount of a pollutant that a water body can receive without violating water quality standards [40 CFR 130.2 (f)]. The loading capacity plus a margin of safety (MOS) is the TMDL and can be expressed in any appropriate terms (i.e. pounds per day, tons per year, etc.). The loading capacity must meet water quality standards and support the beneficial uses of Squaw Creek. Sediment load reductions needed to protect beneficial uses are estimated based on mathematical comparisons of existing and target conditions as described by EPA (1999), then applied to the annual sediment loading of 37,900 tons/year to estimate the load capacity. The biologic condition score was selected for estimating reductions, as the score represents the key benchmark of success to interpret beneficial use support. The biological condition score is also a sensitive, integrative indicator of aquatic habitat suitability, including the effects of sediment discharges from multiple sources over time.

A 25 percent reduction in the overall sediment loading of 37,900 tons per year is estimated to be needed to protect aquatic life beneficial uses. Therefore, the loading capacity is 28,425 tons per year. The estimate is based on comparison of the biologic condition scores of the meadow reach of Squaw Creek, using 2001 data as the baseline, with the biologic conditions found in low gradient reference streams in the Truckee River watershed.

The TMDL identifies percentage reductions needed for several sediment source categories in order to achieve the targeted loading capacity of 28,425 tons per year, which is anticipated to occur in 20 years (starting in 2006). The reduction percentages are shown in Table 8-4.

Implementation of TMDL

The majority of dischargers in the Squaw Creek watershed whose lands are identified as primary sediment sources are currently regulated by the Water Board under WDRs. WDRs have been adopted for Squaw Valley Ski Corporation, The Resort at Squaw Creek, and Intrawest Village to control discharge of waste sediment. The Water Board adopted the WDRs to control ongoing stormwater runoff from ski-related areas; therefore, WDRs have not been adopted for the PlumpJack Inn at Squaw Valley.

Table 8-4
TMDL, Allocations, and Percent Reductions Needed by Sediment Source Category

Sediment Source Category	Sediment Delivery by Source Category (tons/year)	Percent Reduction Required	Load Allocation* (tons/year)
Dirt Roads	9,300	60%	3,700
Dirt Road Cuts	900	50%	450
Road Traction Sand	300	25%	200
Residential/Commercial Areas	200	25%	150
Graded Ski Runs	9,000	50%	4,500
Alluvial Channel Erosion (50 percent of the total load from channel bank erosion is assumed to be controllable)	2,100	10%	1,900
Total Controllable Sources	*21,800*	*50%*	*10,900*
Alluvial Chanel Erosion (50 percent of the total load from channel bank erosion is assumed to be controllable)	2,100	0%	2,100
Undisturbed Areas	14,000	0%	14,000
Total Uncontrollable Sources	*16,100*	*0%*	*16,100*
Total Existing Sediment Load	37,900	Load Allocation to Existing Sources	27,000
Overall Reduction Needed to Achieve TMDL	25%	Load Allocation to Future Growth	150
TMDL = LA (existing and future sources) + MOS	**28,425**	Load Allocation to Margin of Safety (4%)	1,275
		Total Load Allocations	***28,425***

*Allocations to existing sources rounded to the nearest 50 tons.

Source: California Regional Water Quality Control Board, Lahontan Region. Total Maximum Daily Load for Sediment, Squaw Creek, Placer County, Final Staff Report [Table 6-1, pg. 6-1]. April 2006.

Squaw Valley Ski Corporation and the Resort at Squaw Creek

WDRs were adopted under Board Order No. 6-93-25 for SVSC to control the discharge of waste sediment from Squaw Valley Ski Corporation's facility, including ski runs, dirt roads and parking lots. WDRs for The Resort at Squaw Creek (Board Order No.6-93-26A3) require control of waste sediment from its facility, including ski runs, dirt roads, golf course areas and parking lots. Generally, both dischargers are required to identify sources of erosion and sediment delivery, implement programs that minimize the disturbance of natural vegetation, and use BMPs such as revegetation, water bars, drop inlets and other sediment control measures to prevent waste earthen materials from entering surface waters. Examples of specific requirements related to erosion and sedimentation control, common to both permits, are listed below:

- Prior to any disturbance of existing soil conditions, install temporary erosion control facilities to prevent transport of eroded earthen materials.
- Vehicle use shall be restricted to existing roads and disturbed areas.
- All eroding slopes steeper than 2:1 (horizontal:vertical) shall be stabilized.
- All disturbed areas shall be adequately restabilized or revegetated.
- Surface flows from facilities shall be controlled so as not cause erosion.

Annual worklists of erosion control facilities, inspection dates, problems noted, and corrective measures are required. Full compliance with the erosion and sedimentation control requirements of the existing WDRs and monitoring and reporting programs for SVSC and the Resort at Squaw Creek are expected achieve the load allocations specified for all sediment source categories under the management of both facilities within the 20-year TMDL attainment schedule (i.e., 2026).

<u>Intrawest Village at Squaw Valley – Phases I and II</u>

In 2003, WDRs were issued to Intrawest California Holdings, Inc., for the Village at Squaw Valley (Board Order R6T-2003-0002) to regulate stormwater runoff from approximately 15 acres of development, of which approximately 9.5 acres are impervious (paved areas). Treated stormwater from Phase II of the Village is discharged to Squaw Creek rather than infiltrated due to local ground water protection requirements in place to protect the shallow drinking water aquifer. The discharger uses a combination of stormwater treatment and source control measures to protect water quality in Squaw Creek. The stormwater treatment system relies on sand/oil separators and vertical media filter technology designed to treat runoff generated by the 20-year, one-hour storm (i.e., flows up to about 5.5 cubic feet per second). The WDR monitoring program contains numeric effluent limits and receiving water limits set such that water quality objectives in Squaw Creek would not be exceeded. Full compliance with the erosion and sedimentation control requirements of the existing WDRs and monitoring and reporting programs for the Village at Squaw Valley are expected achieve the load allocations specified for all sediment source categories under its management within the 20-year TMDL attainment schedule.

Sedimentation of Squaw Creek from future construction within Squaw Valley is regulated by the Water Board through permits issued under the National Pollutant Discharge Elimination System (NPDES). The State Water Resources Control Board's General Permit for Discharges of Stormwater Associated with Construction Activity (2009-0009-DWQ) applies to dischargers whose projects disturb one or more acres of soil. The General Permit requires all dischargers to:

- Develop and implement a Stormwater Pollution Prevention Plan (SWPPP) that specifies BMPs that will prevent all construction pollutants from contacting stormwater and with the intent of keeping all products of erosion from moving off-site into receiving waters;
- Eliminate or reduce non-stormwater discharges to storm sewer systems and other waters of the nation, and;
- Perform inspections of all BMPs.

Because the permit requires the retention and stabilization of soil and sediment at the construction site, meeting the erosion control requirements of the permit would be expected to meet the load allocation assigned to future growth related to larger construction projects.

TMDL Attainment Progress

Lahontan RWQCB issues status reports on the progress of meeting the numeric targets of the TMDL. According to the most recent (2015) TMDL status report, the biological condition score (BCS) has shown some improvements from 2012 to 2014, but has not met the TMDL BCS target of 25 for continuous flows.[19] Median particle size has increased between 2012 and 2014, but has not met the TMDL target of 40mm or greater. With respect to the numeric target related to percent fines and sand, the data shows a decreasing trend in percent of fines and sand covering the bottom of the stream bed.

<u>Groundwater</u>

Region

The Basin Plan also established water quality objectives for groundwater. Objectives that apply to all groundwater within the Lahontan Region include, bacteria (coliform), chemical constituents, radioactivity, and taste and odor. Page 3-13 of Chapter 3 of the Basin Plan provide the technical water quality objective information pertaining to all surface waters; and this technical material is hereby incorporated by reference, pursuant to CEQA Guidelines Section 15150. Additionally, the Basin Plan specifies that for ground waters under the Truckee River Hydrologic Unit, taste and odor shall not be altered.

The crystalline rocks that surround the basin, granite and andesite, tend to produce groundwater which contains a relatively high proportion of calcium and bicarbonate, with much smaller amounts of magnesium, sodium, and sulfate. The volcanic rocks, in particular, also contain iron and manganese, which may be mobilized under certain naturally occurring conditions in the basin. Water extracted for municipal, residential, fire suppression, and commercial uses by SVPSD and SVMWC does not regularly exceed any primary drinking water standard.[20] A few naturally occurring constituents, including iron and manganese, are closely monitored because they are found in other wells in the basin, even though they remain below drinking water standards in the production wells.

Project Site and Immediate Vicinity

As discussed in detail in Chapter 7, Hazards and Hazardous Materials, of this EIR, two USTs were removed from the project site in the mid-1980s.[21] The former USTs were reportedly located between the conference center and hotel and were utilized for storing diesel fuel oil. Product

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[19] Lahontan Regional Water Quality Control Board. *Squaw Creek TMDL Implementation Status Report*. October 16, 2015.
[20] HydroMetrics LLC. *Olympic Valley Groundwater Management Plan* [pg. 46]. May 2007.
[21] J.H. Kleinfelder & Associates. *Status Report, Soils and Ground Water Investigation, Squaw Valley Inn, Olympic Village, California* [pg. 2]. July 14, 1987.

leakage into the soil surrounding the Squaw Valley Inn was discovered during excavation in the area of one of the abandoned USTs.[22] Inspection by PCEHD personnel led them to believe that the leakage was associated with the product lines that once connected the abandoned tank (Tank No. 1) to the boiler. J.H. Kleinfelder & Associates collected soil and groundwater samples from both former tank locations; these samples indicated the presence of elevated hydrocarbon levels. A series of groundwater monitoring wells were installed at the subject property and the parking lot adjacent to and east of the site in 1986. Lahontan Regional Water Quality Control Board (RWQCB) issued a Cleanup Abatement Order in August 1987 to evaluate the extent of petroleum hydrocarbon contamination in soil and groundwater at the subject property. Impacted soil was removed from the subject property.

Groundwater monitoring was performed between 1987 and 1993, which confirmed a decrease in contaminant concentrations over time. Lahontan issued a case closure letter in December 1993. However, a subsequent investigation performed by Harding Lawson Associates in 1996, in the parking lot east of the subject property, detected diesel in soil and groundwater samples collected from exploratory borings. As a result, Lahontan requested a work plan for further investigation to evaluate potential off-site migration of diesel from the former on-site UST to the Ski Corporation parking lot to the east.

In 1998, in order to carry out Lahontan's work plan, Geocon installed six groundwater monitoring wells within the parking lot east of the subject property.[23] In addition, two groundwater monitoring wells were installed in apparent upgradient and downgradient locations of the former UST at the subject property.[24] The results of the Geocon et al. (1999) investigation indicated that detectable BTEX or methyl-tert-butyl ether (MTBE) were not in soil or groundwater samples collected from on-site or off-site wells. Low concentrations of diesel and motor oil concentrations were detected in the downgradient on-site well.[25] Diesel was detected in some of the groundwater samples collected from off-site wells. Geocon et al. (1999) concluded that the source of diesel-impacted groundwater in off-site wells did not likely originate from the on-site UST but rather from a former pump station that resided in the parking lot east of the subject property.

On September 23, 2009, the Lahontan RWQCB issued a No Further Action Required (NFAR), granting a regulatory closure status, for the PlumpJack site, based upon the following rationale:

- The plume has been adequately defined,
- TPHg (total petroleum hydrocarbons as gasoline) concentrations have not been reported above the respective method reporting limit in approximately nine years while BTEX and MTBE have never been reported on site,

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22 Referred to as "Tank No. 1" in the report.

23 Geocon Consultants. *Site Investigation Report for Ski Corporation Parking Lot, PlumpJack Squaw Valley Inn* [pg. 4]. July 20, 1998.

24 Geocon Consultants. *PlumpJack Squaw Valley Inn Workplan Addendum – Supplemental Site Investigation*. June 17, 1999.

25 Holdrege & Kull. *Phase I Environmental Site Assessment PlumpJack Squaw Valley Inn, Olympic Valley, Placer County, California* [pg. 18]. November 4, 2014.

- Groundwater analytical data and predictive modeling show TPHd concentrations to decrease to levels below 100 ug/L within the next 5.5 years,
- No wells, drinking water, surface water, or any other receptors are likely to be impacted,
- The site presents no significant risk to human health or the environment.

The NFAR letter issued in September of 2009 contained an incorrect address. As such, the Lahontan RWQCB re-issued a NFAR letter for the former UST on November 4, 2014 (see Appendix Q of this EIR for a copy of the 2014 NFAR).

Flooding

According to the Placer County Department of Public Works and Facilities and Preliminary Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), Panel ID 06061C0330H, the proposed project site is located within Flood Hazard Zone X, which is described by FEMA as an area of minimal flood hazard, usually above the 500-year flood level.[26] Thus, development of the proposed project would not place housing within a 100-year flood hazard zone nor place structures within a 100-year floodplain that would impede or redirect flood flows, and restrictions on development or special requirements associated with flooding are not requisite for the project. For this reason, flood-related impacts were determined to be less than significant in the Initial Study prepared for the project (see Appendix C to this EIR), and are not addressed further in this chapter.

8.2 REGULATORY CONTEXT

The following is a description of federal, State, and local environmental laws and policies that are relevant to the review of hydrology and water quality under the CEQA process.

Federal Regulations

The following section includes federal environmental goals and policies relevant to the CEQA review process pertaining to the hydrology and water quality aspects of the proposed project.

Federal Emergency Management Agency (FEMA)

The FEMA is responsible for determining flood elevations and floodplain boundaries based on U.S. Army Corps of Engineers (USACE) studies. FEMA is also responsible for distributing the FIRMs, which are used in the National Flood Insurance Program (NFIP). The FIRMs identify the locations of special flood hazard areas, including the 100-year floodplains. As the project site is not located within a special flood hazard area, FEMA regulations pertaining to development within a floodplain are not applicable.

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[26] Federal Emergency Management Agency. *Region IX National Flood Insurance Program*. Available at http://www.r9map.org/Pages/ProjectDetailsPage.aspx?choLoco=31&choProj=436. Accessed June 2, 2015.

Federal Clean Water Act

The National Pollutant Discharge Elimination System (NPDES) permit system was established in the federal CWA to regulate municipal and industrial discharges to surface waters of the U.S. Each NPDES permit contains limits on allowable concentrations and mass emissions of pollutants contained in the discharge. Sections 401 and 402 of the CWA contain general requirements regarding NPDES permits. Section 307 of the CWA describes the factors that EPA must consider in setting effluent limits for priority pollutants.

Nonpoint sources are diffuse and originate over a wide area rather than from a definable point. Nonpoint pollution often enters receiving water in the form of surface runoff, but is not conveyed by way of pipelines or discrete conveyances. As defined in the federal regulations, such nonpoint sources are generally exempt from federal NPDES permit program requirements. However, two types of nonpoint source discharges are controlled by the NPDES program – nonpoint source discharge caused by general construction activities, and the general quality of stormwater in municipal stormwater systems. The 1987 amendments to the CWA directed the federal EPA to implement the stormwater program in two phases. Phase I addressed discharges from large (population 250,000 or above) and medium (population 100,000 to 250,000) municipalities and certain industrial activities. Phase II addresses all other discharges defined by EPA that are not included in Phase I.

Section 402 of the CWA mandates that certain types of construction activities comply with the requirements of the National Pollutant Discharge Elimination System (NPDES) stormwater program. The Phase II Rule, issued in 1999, requires that construction activities that disturb land equal to or greater than one acre require permitting under the NPDES program. In California, permitting occurs under the General Permit for Stormwater Discharges Associated with Construction Activity, issued to the State Water Resources Control Board (SWRCB), implemented and enforced by the nine RWQCBs.

Construction General Permit

All dischargers with projects that include clearing, grading or stockpiling activities expected to disturb one or more acres of soil are required to obtain compliance under the NPDES Construction General Permit Order 2009-0009-DWQ (effective July 17, 2012). The General Permit requires all dischargers, where construction activity disturbs one or more acres, to develop and implement a Stormwater Pollution Prevention Plan (SWPPP) that contains the following measures:

1. Site map(s) of existing and proposed building and roadway footprints, drainage patterns and storm water collection and discharge points, and pre- and post- project topography;
2. Types and placement of BMPs in the SWPPP that will be used to protect storm water quality;
3. Visual and chemical (if non-visible pollutants are expected) monitoring program for implementation upon BMP failure; and
4. Sediment monitoring plan if the area discharges directly to a water body listed on the 303(d) list for sediment.

To obtain coverage, a SWPPP must be submitted to the RWQCB electronically and a copy of the SWPPP must be submitted to Placer County. When project construction is completed, the landowner must file a Notice of Termination (NOT).

The State Water Board recognizes that certain non-storm water discharges may be necessary for the completion of construction projects. Authorized non-storm water discharges may include those from de-chlorinated potable water sources such as: fire hydrant flushing, irrigation of vegetative erosion control measures, pipe flushing and testing, water to control dust, uncontaminated ground water dewatering, and other discharges not subject to a separate general NPDES permit adopted by a region. Therefore, the General Permit authorizes such discharges provided they meet the following conditions.

These authorized non-storm water discharges must:

1. Be infeasible to eliminate;
2. Comply with BMPs as described in the SWPPP;
3. Filter or treat, using appropriate technology, all dewatering discharges from sedimentation basins;
4. Meet the NALs for pH and turbidity; and
5. Not cause or contribute to a violation of water quality standards.

With reference to the PlumpJack project, which would require construction dewatering, the Construction General Permit could provide coverage for construction dewatering at the project site, assuming that the ground water is not contaminated. If residual contamination of groundwater exists, then, in addition to the Construction General Permit, the applicant may need to obtain a General Permit for Limited Threat Discharges to Surface Waters.

General Permit for Limited Threat Discharges to Surface Waters

Dischargers often need to discharge high quality or relatively pollutant-free water that poses little or no threat to water quality or beneficial uses of water. The Region-wide General NPDES Permit regulates certain categories of these discharges to waters of the United States within the Lahontan Region. To be authorized by the General Permit, discharges must meet the following criteria:

a) Pollutant concentrations in the discharge do not (1) cause, (2) have a reasonable potential to cause, or (3) contribute to an excursion above any applicable federal water quality criterion promulgated by the USEPA pursuant to the Clean Water Act (CWA) Section 301, or water quality objective or prohibition adopted by the Water Board or the State Water Board.
b) Pollutant concentrations in the discharge will not cause or contribute to other than limited, short-term degradation of water quality, or impair beneficial uses of receiving waters.
c) The discharge does not cause acute or chronic toxicity in the receiving waters.
d) Discharge to land is not a practical alternative based on information provided by the Discharger.

The General Permit covers discharges of pollutants to surface waters that constitute low-threat concentrations and/or waste loads meeting criteria specified in the General Permit. The General Permit covers discharges from the following sources, provided that the discharge does not contain or produce significant quantities of pollutants that could adversely affect designated beneficial uses:

a) Diverted stream flows;
b) Construction dewatering;
c) Dredged spoils dewatering;
d) Subterranean seepage dewatering;
e) Well construction and pump testing of potable aquifer supplies;
f) Geothermal well testing involving discharges o heat and/or non-potable water;
g) Hydrostatic testing, maintenance, repair, disinfection and operation of potable water supply pipelines, tanks, and reservoirs, etc.;
h) Water treatment plant backflushing, residuals, and wasting;
i) Fire hydrant testing or flushing; and
j) Hydrostatic testing of newly constructed and yet to be utilized pipelines, tanks, reservoirs, etc., used for purposes other than potable water supply (gas, oil, reclaimed water, etc.).

Potential constituents of concern for construction dewatering include sediments, turbidity, construction materials, and total petroleum hydrocarbons.

The provisions of the General Permit require implementation of BMPs to control and abate the discharge of pollutants to surface waters and to achieve the purposes and intent of compliance with Basin Plan water quality objectives. Attachment A of the General Permit includes guidance for preparing the BMP Plan. Control methods that may be used to treat the discharge and prevent pollutants from impacting water quality and the environment may include but are not limited to:

- Dechlorination of potable water;
- Ponds, trenches or basins for settling solids, or cooling;
- Vegetated filter strips or swales;
- Physical filter for solids, dissolved solids, or total petroleum hydrocarbons (e.g., dirt bad, filter canister, activated carbon filter, sand filter);
- Stable conveyance systems;
- Energy dissipation (structures designed to prevent erosion and slow water velocity associated with conveyance systems);
- Diverting flows around disturbed areas or other pollutant sources using stable conveyances; and
- Flow controls to prevent erosion and flooding, enhance filtration to soil.

State Regulations

The following section includes the State regulations relevant to the CEQA review process pertaining to the hydrology and water quality aspects of the proposed project.

State Water Resources Control Board

The SWRCB and the RWQCBs are responsible for ensuring implementation and compliance with the provisions of the federal CWA and California's Porter-Cologne Water Quality Control Act. The project site is situated within the jurisdictional boundaries of the Lahontan RWQCB (Lahontan RWQCB) (Region 5). The Lahontan RWQCB has the authority to implement water quality protection standards through the issuance of permits for discharges to waters at locations within their jurisdiction.

Lahontan RWQCB Basin Plan

The Water Quality Control Plan for the Lahontan Region (Basin Plan) is the basis for the Regional Board's regulatory program. The Plan sets forth water quality standards for the surface and ground waters of the Region, which include both designated beneficial uses of water and the narrative and numerical objectives that must be maintained or attained to protect those uses. The Plan identifies general types of water quality problems, which can threaten beneficial uses in the Region, as well as identifies required or recommended control measures for such problems. In some cases, the Plan prohibits certain types of discharges in particular areas. The Plan summarizes applicable provisions of separate State Board and Regional Board planning and policy documents (e.g., the Regional Board waiver policy), and of water quality management plans adopted by other federal, state, and regional agencies. The Plan also summarizes past and present water quality monitoring programs, and identifies monitoring activities, which should be carried out to provide the basis for future Basin Plan updates and for waste discharge requirements or conditional waivers.

The Basin Plan implements a number of state and federal laws, the most important of which are the federal CWA (P.L. 92-500, as amended), and the State Porter-Cologne Water Quality Control Act (California Water Code § 13000 et seq.). Other pertinent federal laws include the Safe Drinking Water Act, Toxic Substances Control Act, Resource Conservation and Recovery Act, and Endangered Species Act, and the Comprehensive Response, Compensation, and Liability Act (CERCLA or "Superfund") and Superfund Amendment and Reauthorization Act (SARA). Other applicable California laws include the Health and Safety, Fish and Game, and Food and Agriculture Codes.

Section 13243 of the Water Code gives Regional Boards, in Basin Plans or waste discharge requirements, authority to "specify certain conditions or areas where the discharge of waste, or certain types of waste, will not be permitted." Regional Boards may take enforcement action for violations of waste discharge prohibitions. The Water Code may also contain waste discharge prohibitions that are applicable in the Lahontan Region. The Lahontan Basin Plan identifies the following regionwide prohibitions.

1. The discharge of waste that causes violation of any narrative or numeric water quality objective contained in this Plan is prohibited.
2. Where any numeric or narrative water quality objective contained in this Plan is already being violated, the discharge of waste that causes further degradation or pollution is prohibited.

3. The discharge of waste that could affect the quality of waters of the state that is not authorized by the State or Regional Board through waste discharge requirements, waiver of waste discharge requirements, NPDES permit, cease and desist order, certification of water quality compliance pursuant to CWA section 401, or other appropriate regulatory mechanism is prohibited.
4. The discharge of untreated sewage, garbage, or other solid wastes into surface waters of the Region is prohibited. (For the purposes of this prohibition, "untreated sewage" is that which exceeds secondary treatment standards of the Federal Water Pollution Control Act, which are incorporated in this plan in Section 4.4 under "Surface Water Disposal of Sewage Effluent.").

Pages 4.1-16 through 4.1-18 of Chapter 4, *Implementation*, of the Basin Plan specifies additional prohibitions for the Truckee River Hydrologic Unit, within which the project site is located. This technical material is hereby incorporated by reference, pursuant to CEQA Guidelines Section 15150.

Exempted Low Threat Discharges

The Regional Board has determined that certain discharges are exempt from applicable regionwide and hydrologic unit/area waste discharge prohibitions subject to all the conditions set forth below.

1. For proposed discharges to surface water, the applicant must provide information supporting why discharge to land is not practicable.
2. The discharge must not adversely affect the beneficial uses of the receiving water.
3. The discharge must comply with all applicable water quality objectives.
4. Best practicable treatment or control of the discharge shall be implemented to ensure that pollution or nuisance will not occur.
5. The discharge of pesticides to surface or ground waters is prohibited.

Among the discharge categories for low-threat discharges that are applicable to the PlumpJack project is construction dewatering. The conditions for exemption under this category include a condition that the project site must not be in an area of known soil or groundwater contamination where that contamination could adversely affect the discharge and/or the receiving water. Based upon discussion with the Lahontan RWQCB, the PlumpJack applicant would need to submit groundwater screening samples to confirm that residual groundwater contamination is no longer present underneath the project site, in which case the construction dewatering for the project would qualify as an exempted low-threat discharge.[27] If, on the other hand, residual contamination exists, the applicant would need to apply for a General Permit for Limited Threat Discharges to Surface Waters, which would include submittal of a BMP and Monitoring Plan to demonstrate how pumped groundwater would be treated on-site such that all discharge complies with the water quality objectives for Squaw Creek, and applicable beneficial uses are not adversely affected.

[27] Personal communication between Bud Amorfini, Engineering Geologist, Lahontan Regional Water Quality Control Board, and Nick Pappani, Vice President, Raney Planning and Management, Inc. June 15, 2016.

Local Regulations

The local policies and regulations applicable to the proposed project related to hydrology and water quality are presented below.

Placer County General Plan

The following goals and policies of the *Placer County General Plan* related to hydrology and water quality are applicable to the proposed project.

Water Supply and Delivery

Goal 4.C To ensure the availability of an adequate and safe water supply and the maintenance of high quality water in water bodies and aquifers used as sources of domestic supply.

Policy 4.C.4 The County shall require that water supplies serving new development meet state water quality standards.

Policy 4.C.5 The County shall require that new development adjacent to bodies of water used as domestic water sources adequately mitigate potential water quality impacts on these water bodies.

Policy 4.C.11 The County shall protect the watersheds of all bodies of water associated with the storage and delivery of domestic water by limiting grading, construction of impervious surfaces, application of fertilizers, and development of septic systems within these watersheds.

Drainage and Water Quality

Goal 4.E To manage rainwater and stormwater at the source in a sustainable manner that least inconveniences the public, reduces potential water-related damage, augments water supply, mitigates storm water pollution, and enhances the environment.

Policy 4.E.1 The County shall encourage the use of natural stormwater drainage systems to preserve and enhance natural features.

Policy 4.E.4 The County shall ensure that new storm drainage systems are designed in conformance with the Placer County Flood Control and Water Conservation District's Stormwater Management Manual and the County Land Development Manual.

Policy 4.E.5 The County shall continue to implement and enforce its Grading, Erosion and Sediment Control Ordinance and Flood Damage Prevention Ordinance.

Policy 4.E.6 The County shall continue to support the programs and policies of the watershed flood control plans developed by the Flood Control and Water Conservation District.

Policy 4.E.7 The County shall prohibit the use of underground storm drain systems in rural and agricultural areas, unless no other feasible alternatives are available for conveyance of stormwater from new development or when necessary to mitigate flood hazards.

Policy 4.E.9 The County shall encourage good soil conservation practices in agricultural and urban areas and carefully examine the impact of proposed urban developments with regard to drainage courses.

Policy 4.E.10 The County shall strive to improve the quality of runoff from urban and suburban development through use of appropriate site design measures including, but not limited to vegetated swales, infiltration/sedimentation basins, riparian setbacks, oil/grit separators, rooftop and impervious area disconnection, porous pavement, and other BMPs.

Policy 4.E.11 The County shall require new development to adequately mitigate increases in stormwater peak flows and/or volume. Mitigation measures should take into consideration impacts on adjoining lands in the unincorporated area and on properties in jurisdictions within and immediately adjacent to Placer County.

Policy 4.E.12 The County shall encourage project designs that minimize drainage concentrations and impervious coverage and maintain, to the extent feasible, natural site drainage conditions.

Policy 4.E.13 The County shall require that new development conforms with the applicable programs, policies, recommendations, and plans of the Placer County Flood Control and Water Conservation District.

Policy 4.E.15 The County shall require that new development in primarily urban development areas incorporate low impact development measures to reduce the amount of runoff, to the maximum extent practicable, for which retention and treatment is required.

Policy 4.E 16 — The County shall identify and coordinate mitigation measures with responsible agencies for the control of storm drainage systems, monitoring of discharges, and implementation of measures to control pollutant loads in urban storm water runoff (e.g., California Regional Water Quality Control Board, Placer County Environmental Health Division, Placer County Department of Public Works and Facilities, CDRA Engineering and Surveying Division, Placer County Flood Control and Water Conservation District).

Policy 4.E.17 — The County shall strive to protect domestic water supply canal systems from contamination resulting from spillage or runoff.

Flood Protection

Goal 4.F — To protect the lives and property of the citizens of Placer County from hazards associated with development in floodplains and manage floodplains for their natural resource values.

Policy 4.F.1 — The County shall require that arterial roadways and expressways, residences, commercial and industrial uses and emergency facilities be protected, at a minimum, from a 100-year storm event.

Policy 4.F.4 — The County shall require evaluation of potential flood hazards prior to approval of development projects. The County shall require proponents of new development to submit accurate topographic and flow characteristics information and depiction of the 100-year floodplain boundaries under fully developed, unmitigated runoff conditions.

Policy 4.F.14 — The County shall ensure that new storm drainage systems are designed in conformance with the Placer County Flood Control and Water Conservation District's Stormwater Management Manual and the County's Land Development Manual.

Flood Hazards

Goal 8.B To minimize the risk of loss of life, injury, damage to property, and economic and social dislocations resulting from flood hazards.

Policy 8.B.1 The County shall promote flood control measures that maintain natural conditions within the 100-year floodplain of rivers and streams.

Policy 8.B.2 The County shall continue to participate in the Federal Flood Insurance Program.

Policy 8.B.3 The County shall require flood proofing of structures in areas subject to flooding.

Policy 8.B.4 The County shall require that the design and location of dams and levees be in accordance with all applicable design standards and specifications and accepted state of-the-art design and construction practices.

<u>Placer County Stormwater Quality Program</u>

Placer County is a designated municipal permitee under the federal NPDES, which regulates stormwater flows into natural water bodies. The NPDES regulations require permitted areas to implement specific activities and actions to eliminate or control stormwater pollution. Under the Phase I NPDES program, Placer County shares a permit with El Dorado County and the City of South Lake Tahoe for the Lake Tahoe watershed area. Under the Phase II NPDES program, Placer County is permitted in the western county area and in the Truckee River Basin.

The County's Stormwater Quality Program incorporates federal and State regulations for stormwater quality and includes educational outreach to inform members of the public and businesses of the effects of their activities, controls on construction activities, standards for design of new developments, and a program to assure that County operations themselves are clean. The County's Stormwater Quality Ordinance (Article 8.28, discussed in further detail below) effectively prohibits the disposal of anything except clean water into ditches, creeks, and streams.

The County implements the Stormwater Quality Program countywide. The cities of Auburn, Colfax, Lincoln, Loomis, Rocklin, and Roseville, each have their own separate permits. The County has three State permitted areas: Tahoe, Truckee, and Western Placer. In addition, the County has a water quality monitoring plan for the Truckee River Watershed, which requires ongoing monitoring in Martis Creek, Squaw Valley, Alpine Meadows, and the Truckee River.

Placer County Flood Control and Water Conservation District

Formed by Senate Bill 1312, the Placer County Flood Control and Water Conservation District (PCFCWCD) is responsible for regional strategies for flood control management. A *Stormwater Management Manual* (SWMM) was developed by the PCFCWCD to relate the policies, guidelines, and specific criteria for evaluating hydrologic conditions associated with new development projects.

Placer County Truckee River Basin Stormwater Management Plan

Building on the SWMM, in 2007 the *Truckee River Basin Stormwater Management Plan* was published, which provides a comprehensive program to reduce pollution in stormwater runoff located in the Placer County portion of the Middle Truckee River Watershed. The *Truckee River Basin Stormwater Management Plan* is implemented in compliance with NPDES Phase II General Municipal Permit No. CAS000004 and WQCB Order No. 2003-005-DWQ.

Placer County Land Development Manual

Section 5 of the Placer County Land Development Manual (1996) provides supplemental design considerations for drainage facilities, and includes specific criteria used for preparation of drainage reports identical to those in the SWMM (as described above under Placer County Flood Control and Water Conservation District). The Land Development Manual states that in case of conflict with the SWMM, the most stringent requirement shall apply. The Land Development Manual also contains general information with regard to erosion control and BMPs for stormwater drainage.

Placer County Code

Chapter 15, Building and Development, of the Placer County Code includes ordinances associated with hydrology and water quality. The applicable ordinances are discussed in further detail below.

Stormwater Quality Ordinance

Article 8.28, Stormwater Quality Ordinance, is intended to ensure that Placer County is compliant with State and federal laws related to stormwater quality by enhancing and protecting the quality of waters of the State in Placer County through reducing pollutants in stormwater discharges to the maximum extent practicable and controlling non-stormwater discharges to the storm drain system. The Stormwater Quality Ordinance requires the use of BMPs to reduce adverse effects of polluted runoff discharges on waters of the State, and prohibits illicit discharges to the storm drain system. The Stormwater Quality Ordinance establishes the County's authority to adopt requirements for stormwater management, including source control requirements, to reduce pollution to the maximum extent practicable; requirements for development projects to reduce stormwater pollution and erosion both during construction and after the project is complete; and enable the County to implement and enforce any stormwater management plan adopted by the County.

Grading, Erosion and Sediment Control Ordinance

Article 15.48, Grading, Erosion and Sediment Control Ordinance, of the Placer County Code regulates grading on property within the unincorporated area of Placer County in order to safeguard life, limb, health, property and public welfare; to avoid pollution of watercourses with hazardous materials, nutrients, sediments, or other earthen materials generated on or caused by surface runoff on or across the permit area; and to ensure that the intended use of a graded site is consistent with the PCGP, any specific plans adopted thereto and applicable Placer County ordinances including the Zoning Ordinance, Flood Damage Prevention Ordinance (Article 15.52 of the Placer County Code), Environmental Review Ordinance (Chapter 18 of the Placer County Code), and applicable chapters of the California Building Code. In the event of conflict between applicable chapters and Article 15.48, the most restrictive shall prevail. Part 6 of Article 15.48 sets forth design standards for grading activities such as excavation, slopes, fill soil, setbacks, and drainage.

<u>Squaw Valley General Plan and Land Use Ordinance</u>

The *Squaw Valley General Plan and Land Use Ordinance* (SVGPLUO) was adopted in 1983 as part of Placer County code.

Section V. Environmental Resources Element, Subsection F. Streams and Waterways establishes goals to restore already disturbed drainage areas and to prevent further disturbance, specifically relating to Sections 115, 118, and 121 of the SVGPLUO listed below.

Section 115 of the SVGPLUO addresses drainage/water quality, including: Section 115.14 requiring drainage systems to prevent water quality degradation; limiting work within the 100-year floodplain aside from actions to restore areas previously modified by channelization, fill, or other human activities (Section 115.20); and Section 115.23 that adds additional beneficial function requirements on restoration.

Section 118 of the SVGPLUO addresses erosion control and requires a sedimentation and erosion control plan (Section 118.12) including both construction and long-term measures (Section 118.14) as part of grading, drainage, or improvement plans reviewed by the County DPW. Section 118 does not specify the types of measures to be used but recommends suitable measures and requires revegetation of all disturbed surfaces that will not be part of the approved final impervious surfaces (Section 118.18).

Section 121 of the SVGPLUO, requires that adequate space be provided for storage of snow, and considers that a functional area be 20 percent of the clearable area not including storage along public roads, and that storage may not be within the 100-year floodplain.

Section 139 of the SVGPLUO addresses setbacks for residential structures (Section 139.10) and commercial structures (Section 139.12), setbacks in areas where the floodplain has not been established (Section 139.14), and additional special setbacks (Section 139.10).

Other

Placer County requires, as part of its standard conditions, that drainage BMPs be designed according to the guidance of the *California Stormwater Quality Association Stormwater Best Management Practice Handbooks for Construction, for New Development / Redevelopment, and for Industrial and Commercial* (or other similar source as approved by the Engineering and Surveying Division). The general purpose of the handbooks is to provide general guidance for selecting and implementing BMPs to reduce pollutants in runoff in newly developed areas and redeveloped areas to waters of the state. The handbook also provides guidance on developing project-specific stormwater management plans including selection and implementation of BMPs for a particular development or redevelopment project, with a focus on reducing the rate and amount of runoff.

8.3 Impacts and Mitigation Measures

The following section describes the standards of significance and methodology utilized to analyze and determine the proposed project's potential impacts related to hydrology and water quality. A discussion of the project's impacts, as well as mitigation measures where necessary, is also presented.

Standards of Significance

Consistent with Appendix G of the CEQA Guidelines and the County's General Plan, a significant impact would occur if the proposed project would result in the following:

- Violate any federal, state or county potable water quality standards;
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lessening of local groundwater supplies (i.e. the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted);
- Substantially alter the existing drainage pattern of the site or area;
- Increase the rate or amount of surface runoff;
- Create or contribute runoff water which would include substantial additional sources of polluted water;
- Otherwise substantially degrade surface water quality;
- Otherwise substantially degrade ground water quality;
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard boundary or Flood Insurance Rate Map or other flood hazard delineation map;
- Place within a 100-year flood hazard area improvements which would impede or redirect flood flows; or
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.

Issues Not Discussed Further

It should be noted that the Initial Study prepared for the proposed project (see Appendix C) determined that development of the proposed project would result in a less-than-significant impact related to the following:

- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard boundary or Flood Insurance Rate Map or other flood hazard delineation map;
- Place within a 100-year flood hazard area improvements which would impede or redirect flood flows; and
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.

Accordingly, impacts related to the above are not further analyzed or discussed in this EIR chapter. In addition, the proposed project's impacts associated with water supply and capacity are further addressed in the *Utilities* chapter of this EIR.

Method of Analysis

The impacts analysis for this chapter is based primarily on the *Preliminary Drainage Report for PlumpJack Squaw Valley Inn* and the *Hydrogeologic and Groundwater Management Report* prepared by the Gary Davis Group and Holdrege & Kull respectively. In addition, information from the *Placer County General Plan,* and associated EIR, and the SVGPLUO was utilized.

Preliminary Drainage Report for PlumpJack Squaw Valley Inn

The drainage report prepared for the proposed project by the Gary Davis Group evaluates drainage conditions associated with the proposed construction utilizing Placer County methodology. The drainage study models the response of the local watershed to design storm events (10-year and 100-year) under peak discharge conditions for both pre-development and post-development scenarios and determines the impact of the proposed development. Preliminary sizing requirements for proposed permanent water quality BMPs and the storm sewer system are also estimated for the site based on the local design criteria. The primary objective of the drainage report is to estimate pre-development and post-development peak discharges for design storm events to adequately convey flows in accordance with Placer County.

The Placer County Storm Water Management Manual (SWMM) has requirements relative to drainage design for projects. The requirements, in addition to project specific design criteria, and those of the Lahontan Regional Water Quality Control Board (RWQCB) comprise the overall design requirements to which the project shall adhere. The various conditions and requirements can be summarized in the following basic criteria:

- Collected runoff from impervious surfaces shall be treated on-site for up to and including the 20-year 1-hour storm event. The depth of rainfall for this storm is estimated, by

Lahontan RWQCB, to be 0.7 inch over the impervious surfaces, as specified in the Lahontan Regional Water Quality Control Board General Permit R6T-2003-0004, Attachment G.

- Provide estimated peak flows of the 10-year 24-hour and 100-year 24-hour storm events for both pre and post development scenarios.
- Placer County Small Watershed Peak Flow Sheets are used to estimate the time of concentration and peak flow quantities. The process for determining model input parameters is outlined in the SWMM, Section V. Hydrology, dated September 1, 1990.
- Storm drainage facilities will be designed to provide groundwater recharge, attenuate peak flows, and minimize risk of erosion.
- Existing watershed boundaries and drainage patterns will be generally maintained with proposed site layout and grading.
- Improvements will be protected from inundation, flood hazard, and ponding.
- Flow concentrations shall not cause property damage.
- The 100-year peak runoff shall be conveyed in a manner without compromising any structures or overtopping any road surfaces (overland release).
- All construction activities and permanent improvements shall include temporary and permanent BMP's for the protection of water resources.

Hydrogeologic and Groundwater Management Report Supplement No. 2

The hydrogeologic report presents the results Holdrege & Kull's hydrogeologic and groundwater management evaluation for the proposed PlumpJack Squaw Valley Inn project. The report included the following tasks:

- Review of subsurface information previously obtained at the site, as described in Holdrege & Kull's August and December 2014 Geotechnical Engineering Reports;
- Review of subsurface information obtained by others at the project site pertaining to groundwater and soil conditions;
- Review of readily available geologic and hydrogeologic literature and maps covering the project area;
- Review of local and state regulatory agency requirements for soil and groundwater management related to petroleum hydrocarbon impacts from former underground fuel storage tanks at the site;
- Review of local and state regulatory requirements for temporary groundwater well construction, permanent destruction, and erosion control monitoring and reporting during project construction; and
- Engineering analysis and modelling of groundwater conditions at the site to calculate the anticipated displaced groundwater from the proposed underground parking garage, evaluate proposed groundwater impacts and dewatering considerations related to the proposed underground parking garage, and the interaction of groundwater and adjacent Squaw Creek.

As part of the report, Holdrege & Kull calculated the amount of dewatering that would need to occur under two different construction approaches to excavating the underground parking garage. For either construction method, the potential effect of the garage on the groundwater flow directions and gradients was modeled using SLIDE 5.0 computer software. SLIDE 5.0 is a two dimensional finite element computer software program and is the same analysis for either method of construction. As part of the analysis, Holdrege & Kull reviewed the Squaw Valley Creek/Aquifer Study Model Update Report (2013).

PlumpJack Well Impact Evaluation

Generally, HydroMetrics WRI reviewed location and pumping data for two proposed well locations on the PlumpJack project site, added the well data to an existing, calibrated groundwater model, ran model simulations of predicted future conditions, and performed an analysis of the effects of pumping on Squaw Creek.

More specifically, the long-term effects from pumping the proposed PlumpJack well were estimated using the calibrated Squaw Valley groundwater model. HydroMetrics WRI developed this groundwater flow model for the Olympic Valley (Valley) Groundwater Basin, which has been used in a number of previous studies and investigations. The groundwater model was constructed in 2001 using the widely-accepted MODFLOW software package that was developed by the U.S. Geological Survey. Since its original construction, the model has been updated by HydroMetrics several times to incorporate new subsurface and stream data as they became available.

The pumping rates simulated at the new PlumpJack wells were set to be similar to the pumping in the VSVSP EIR WSA model scenarios to allow consistency with previous model analyses. Of the two VSVSP EIR model scenarios that contained pumping from the proposed PlumpJack well (formerly NEW-14/08), the scenario with the highest simulated flowrates from this well was chosen to conservatively represent the PlumpJack well's future pumping, and this pumping was added to the current model.

Project-Specific Impacts and Mitigation Measures

The following discussion of impacts is based on the implementation of the proposed project in comparison with the standards of significance identified above.

8-1 Violate any water quality standards or waste discharge requirements or otherwise substantially degrade water quality during construction. Based on the analysis below and with implementation of mitigation, the impact is *less than significant*.

Impacts Associated with Erosion

The State Water Resources Control Board's (State Board's) General Permit for Discharges of Stormwater Associated with Construction Activity (99-08-DWQ), applies to dischargers whose projects disturb one or more acres of soil or whose projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres. The General Permit requires all dischargers, where construction activity disturbs one or more acres, to develop and implement a Stormwater Pollution Prevention Plan (SWPPP) that contains the following measures:

1. Site map(s) of existing and proposed building and roadway footprints, drainage patterns and storm water collection and discharge points, and pre- and post-project topography;
2. Types and placement of BMPs in the SWPPP that will be used to protect storm water quality;
3. Visual and chemical (if non-visible pollutants are expected) monitoring program for implementation upon BMP failure; and
4. Sediment monitoring plan if the area discharges directly to a water body listed on the 303(d) list for sediment.

All applicable project proponents in the Squaw Creek watershed are responsible for obtaining coverage under the General Permit prior to commencement of construction activities. To obtain coverage, the landowner must file a Notice of Intent (NOI) with a vicinity map and the appropriate fee with the Water Board. Because the permit requires the retention and stabilization of soil and sediment at the construction site, it is expected that meeting the erosion control requirements of the permit will meet the load allocation assigned to future growth related to larger construction projects.[28]

As part of the SWPPP for the proposed project, a sediment monitoring plan will need to be provided for review and approval of the Lahontan RWQCB. The extent of monitoring will be dependent upon whether the construction project is considered Risk Level 2 or Risk Level 3. When applying to the Lahontan RWQCB for the Construction General Permit, the applicant will need to calculate the Risk Level for the project, and develop a monitoring plan accordingly. The monitoring requirements for risk levels are set forth in Appendix D and Appendix E of the Construction General Permit.[29]

The potential for soil erosion during construction is further addressed in Impact 6-2 of Chapter 6, *Geology and Soils*, and mitigation measures, requiring compliance with the SWRCB's General Permit, are set forth to ensure that impacts associated with soil erosion during construction are less than significant.

Construction Dewatering

Construction dewatering will be required during excavation of the proposed underground parking garage. The amount of dewatering will depend upon the construction methods utilized by the contractor during excavation and development of the underground garage. Two different construction methods are being considered for the proposed project; therefore, both methods are evaluated in this EIR. Method 1 consists of vertical coffer

[28] California Regional Water Quality Control Board, Lahontan Region. *Total Maximum Daily Load for Sediment, Squaw Creek, Placer County, Final Staff Report* [pg. 9-6]. April 2006.
[29] California State Water Resources Control Board. *Storm Water Program*. Available athttp://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml. Accessed June 15, 2016.

dams and installation of a jet grout floor. This method will minimize the amount of construction dewatering required during excavation of the underground garage. Method 2 consists of vertical coffer dams without the installation of a jet grout floor.

Method 1: Jet Grouting

The jet grouting method will involve cement deep soil mixing (CDSM) to form perimeter walls approximately three feet thick at the outside of the planned structure for shoring and to provide a horizontal groundwater flow barrier; and jet grouting to form a horizontal grout bottom that will provide a vertical barrier to groundwater flow.

The excavation phase will begin with CDSM activities to install the shoring walls. Employing a drill rig equipped with paddles for mixing and a nozzle to introduce the cement, the rig will drill down to the designed depth of the walls, introduce the cement into the void and begin combining the soil/cement mixture to create grout columns that form a contiguous, impermeable grout wall for shoring. The columns will be placed around the entire perimeter of the proposed garage excavation, or approximately 1,876 linear feet. Halfway through the CDSM process, the jet grouting will begin inside the perimeter of the proposed excavation area. A contiguous series of drill points will be plotted to create an impermeable grout bottom that will withstand the calculated hydrostatic pressure and uplift exerted on the eventual underground parking structure. The five-foot jet grout plug will cover the entire area of the excavation, or approximately 64,000 square feet. The grout envelope will result in the displacement of storativity within the Olympic Valley Groundwater Basin. This effect is addressed in Impact 8-4 of this Chapter.

Once the walls and bottom of the grouted shoring have been completed, the contractor will begin excavating and install a series of approximately 470 tiebacks to support the walls of the excavated area. By October 15th the contractor will have excavated approximately 32,200 cubic yards of soil. The contractor will finally waterproof and form the foundation floor and walls directly against the grouted shoring and complete the underground foundation work by November 15th. The anticipated schedule for Method 1 is as follows:

- Apply for Lahontan RWQCB Permit: February 1 – March 31, 2017
- Demolition: April 1 – April 30, 2017
- CDSM for Horizontal Barrier (Walls): April 15 – June 30, 2017
- Jet Grout for Vertical Barrier (Bottom): June 1 – August 15, 2017
- Install Tiebacks: August 16 – September 15, 2017
- Excavation: September 16 – October 15, 2017
- Foundation: October 16 – November 15, 2017

With respect to excavation depths, the approximate ground level surface is 6,210 feet and the lower level of the parking structure is planned to be at an elevation of 6,196 feet (MSL). Given the floor thickness and planned utilities, general excavation is assumed to extend to elevation 6,192 feet. With an additional five feet for the proposed jet grout barrier, the ultimate excavation depth for the underground parking garage will be approximately 6,187 feet (see Figure 8-3).

CDSM is a ground improvement technique to modify in-situ conditions by injecting water and cementitious binder (grout slurry) through augers that mix it with the soil, forming in-place soil-cement columns. The binder slurry is pumped through the drill steel to the tool as it advances and additional soil mixing is achieved as the tool is withdrawn. The technique has been used to increase bearing capacity, decrease settlement, increase global stability, mitigate liquefaction potential, and reduce permeability of native soil.

Jet grouting is a grouting technique that creates in situ geometries of soilcrete (grouted soil), using a grouting monitor attached to the end of a drill stem. The jet grout monitor is advanced to the maximum treatment depth, at which time high velocity grout jets (and sometimes water and air) are initiated from ports in the side of the monitor. The jets erode and mix the in situ soil as the drill stem and jet grout monitor are rotated and raised.

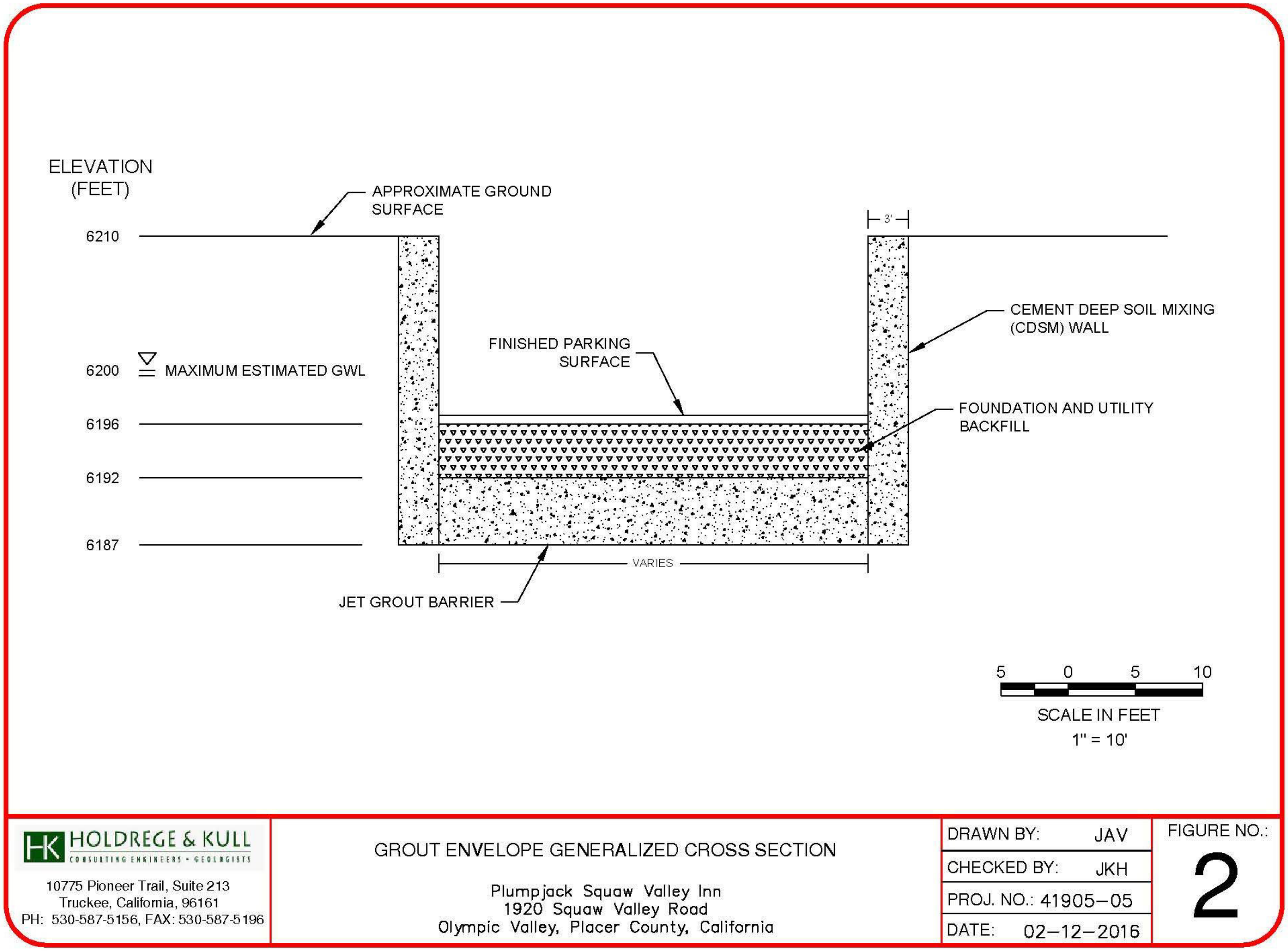
Both CDSM and jet grouting techniques have been used extensively near rivers and creeks, including a great deal of ground improvement for state and federal levee projects that line the banks of rivers in California and elsewhere in the United States. The techniques have been used to stabilize the ground for supporting embankments and providing seepage barriers to inhibit subsurface groundwater flow. Jet grouting has been used extensively in the Sacramento and American River basins near Sacramento, California.

The basic materials used to produce grout for underground use are the same as those used in aboveground applications. Neat grout comprised of Portland cement and water is commonly used underground. Portland cement is hydraulic cement composed primarily of hydraulic calcium silicates. Hydraulic cement sets and hardens by reacting chemically with water. The process is called "hydration." Concrete and grout made with Portland cement will set and harden underwater. Type I or Type II Portland cement is most often specified for grouting underground. The cements have low mobility and leaching potential in groundwater.

Dewatering will utilize localized sumps or point wells within the excavation to remove the initial groundwater within the planned excavation and then to remove any groundwater that leaks through the grout envelope surrounding the excavation. Holdrege & Kull has estimated that the initial volume of groundwater in the excavation area will be approximately 376,000 gallons.[30]

[30] Holdrege & Kull. *Hydrogeologic and Groundwater Management Report Supplement No. 2* [pg. 4]. February 12, 2016.

Figure 8-3
Cross-Section of Proposed Underground Parking Garage



Holdrege & Kull anticipates that implementation of the grout envelope would result in a significant reduction in groundwater flowing into the proposed excavation and would require less than 10 days for initial dewatering, assuming six to eight dewatering wells, based on a single temporary dewatering well capacity of 46,000 gpd.[31]

In addition to the initial amount of dewatering, for Method 1 Holdrege & Kull estimates a rate of 1 to 2 gallons per minute (1,000 to 2,000 gallons per day) of groundwater leaking through the grout envelope. Dewatering will occur from the planned start of excavation (September 1) through completion of foundations (November 15) or approximately 76 days. Therefore, Holdrege & Kull estimates the total volume of dewatering that would be needed to address leakage through the grout envelope during construction (Sept 1 to Nov 15) to be approximately 76,000 to 152,000 gallons, or 1.75 acre-feet to 3.5 acre-feet of water. This is in addition to the 376,000 gallons within the excavation prior to leakage. This dewatering is expected to be temporary because after the foundations and retaining walls are constructed for the parking garage, the dewatering will stop. The parking structure will be waterproofed and designed to resist hydrostatic forces due to groundwater. Therefore, the temporary dewatering will cease to occur at the end of foundation construction.

Method 2: Vertical Coffer Dams

To reduce the potential for long-term aquifer storage loss caused by the additional five feet of excavation necessary to utilize Method 1, the bottom jet grout barrier, intended to reduce vertical flow, will be eliminated under Method 2. Method 2 method consists of construction of the vertical CDSM columns discussed above. Given the anticipated construction schedule,[32] the groundwater level will vary during construction and the excavation could be dewatered without the bottom barrier. Based on well data, Holdrege & Kull estimates that the average groundwater level from May 1 to May 31 to be at 6,197.0 feet, from June 1 to July 15 to be at 6,195.5 feet, and July 16 to October 16 to be at 6,193.5 feet. Groundwater could be lowered within the vertical cofferdam to approximately 6,190 feet, resulting in a water level drop of 3.5 to 7 feet for the above

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[31] *Ibid.*

[32] davisREED Construction Inc.'s proposed construction schedule is based on Holdrege & Kull's proposed phasing of the garage construction into three segments (A, B, and C), a phasing which was devised in order to manage the maximum discharge volumes possible.

- Apply for Lahontan RWQCB Permit: February 1 – March 31, 2017
- Demolition: April 1 – April 30, 2017
- Section C Dewatering System Install: April 15 – April 30, 2017
- Section C Earthwork & Shoring: May 1 – May 15, 2017
- Section C Foundation: May 16 – May 31, 2017
- Section A Dewatering System Install: June 1 – June 15, 2017
- Section A Earthwork & Shoring: June 16 – June 31, 2017
- Section A Foundation: July 1 – July 15, 2017
- Section B Dewatering System Install: July 16 – August 15, 2017
- Section B Earthwork & Shoring: August 16 – September 15, 2017
- Section B Foundation: September 16 – October 15, 2017

time periods. The excavation depth for Method 2 is planned to approximate elevation 6,192 feet or about 18 feet below the ground surface.

Holdrege & Kull has estimated that, using a vertical cofferdam only, the flow rate and total volume for PlumpJack construction dewatering would be as follows:

Water Discharge

Under both Method 1 and Method 2, all water will be pumped through an on-site storage and treatment system prior to: 1) on-site use for dust control purposes; and/or 2) discharge to Squaw Creek, and/or 3) off-site disposal. The on-site treatment system will consist of a filtration system through which water is filtered to remove sediment, and then a separate carbon filter system to remove petroleum hydrocarbons, if present. Due to the anticipated volume of water to be removed during construction, Holdrege & Kull anticipates that the groundwater storage and treatment system would consist of a filtration bin/phase separator weir tank to reduce sediment loads (such as that provided by Denbeste Manufacturing or other supplier). To help mitigate groundwater impacted with petroleum hydrocarbons, the treatment system would be equipped with a carbon filter as the end treatment phase. The process would be a continuous flow system.

Given the limited amount of dewatering required for Method 1, the pumped water could likely be discharged on-site for dust control and/or hauled for off-site use. However, given the dewatering volumes anticipated under Method 2, shown in Table 8-5, Method 2 is anticipated to require discharge to Squaw Creek.

<u>Discharge to Squaw Creek</u>

Discharge of pumped groundwater to Squaw Creek will not be allowed unless first permitted by the Lahontan RWQCB. As previously discussed, groundwater underlying the project site was previously subjected to contamination; however, the Lahontan RWQCB has since issued a No Further Action Required letter for the project site. Based upon discussion with the Lahontan RWQCB, the PlumpJack applicant will need to submit groundwater screening samples to confirm that residual groundwater contamination is no longer present underneath the project site, in which case the construction dewatering for the project, and discharge of the pumped groundwater to Squaw Creek, would qualify as an exempted low-threat discharge.[33] If, on the other hand, residual contamination exists, the applicant will need to apply for a General Permit for Limited Threat Discharges to Surface Waters, which will include submittal of a BMP and Monitoring Plan to demonstrate how pumped groundwater will be treated on-site such that all discharge complies with the water quality objectives for Squaw Creek, and applicable beneficial uses are not adversely affected. Under this scenario, the BMP Plan for the PlumpJack project would require all pumped

[33] Personal communication between Bud Amorfini, Engineering Geologist, Lahontan Regional Water Quality Control Board, and Nick Pappani, Vice President, Raney Planning and Management, Inc. June 15, 2016.

groundwater associated with construction dewatering to be routinely treated through a carbon filter for potential hydrocarbon contamination in order to address regionwide and Truckee River Hydrologic Unit prohibitions.

Table 8-5
PlumpJack Construction Dewatering Using Method 2
Estimated Maximum Flow Rates

Sections[1]	April 30 - May 31	June 1 – July 15	July 16 – October 15
C	160,000 gpd	126,000 gpd	80,000 gpd
A	--	135,000 gpd	86,000 gpd
B	--	--	178,000 gpd
Total	**160,000 gpd**	**261,000 gpd**	**344,000 gpd[2]**

Notes:
[1] Sections refer to the sections of the excavation area that will be sequentially excavated and dewatered.
[2] HydroMetrics has stated their belief that this provides a reasonable estimate of expected dewatering considering the site conditions and hydrogeology for the reasons set forth below (see HydroMetrics. *PlumpJack Dewatering Plan Review*. March 15, 2016, p. 3).

In 2002, IntraWest Corporation (Intrawest) completed Phase II of the planned construction for a new village in Squaw Valley. This phase included underground parking structures. The excavations for these structures were dewatered during construction. Intrawest provided SVPSD with construction dewatering data for March, 2002 and April 2002 (Williams, 2002).

Intrawest used seven active dewatering wells during March and April, 2002. The average daily pumping rate for all seven dewatering wells combined was 235 gallons per minute during March, and 683 gallons per minute during April. This equates to a daily extraction rate of 338,400 gallons per day during March, and 983,420 gallons per day during April. This is consistent with PlumpJack's July 16 to October 15 dewatering rate estimate of approximately 344,000 gallons per day as presented in Holdrege & Kull's Hydrogeologic and Groundwater Management Report Supplement No. 2. Therefore, based on previous dewatering experiences, PlumpJack's revised dewatering rate estimates are reasonable.

The similarities between H&K's calculated dewatering rates and the observed dewatering rates at the Intrawest property gave Hydrometrics confidence that the H&K estimates were within a reasonable range for local hydrogeologic conditions. Although Hydrometrics compared dewatering rates from two different times of year, and there is some seasonality to groundwater elevations at the site, the discrepancies in dewatering rates between H&K's calculations and the Intrawest site likely owe as much to differences in excavation size, and configuration, as to seasonal hydrology. It should be noted that H&K's dewatering estimates for the April-May period correspond to only one section of the PlumpJack excavation area. Based on previous experience working in the basin, Hydrometrics' comparison indicates that the hydraulic parameters used in H&K's analysis resulted in the reasonable range of other dewatering projects within the same basin.

Source: Holdrege & Kull. Hydrogeologic and Groundwater Management Report Supplement No. 2. February 12, 2016.

Conclusion

Construction dewatering will be required for excavation of the proposed underground parking garage. The extent of dewatering will depend upon whether Method 1 or Method 2 is employed during the excavation phase. Regardless of the method employed, construction dewatering has the potential to violate water quality objectives set by the Lahontan Basin Plan if sufficient on-site storage and treatment system controls are not utilized during excavation of the underground garage. With implementation of the following mitigation measure, the impact related to violating any water quality standards or waste discharge requirements or otherwise substantially degrade water quality during construction would be ***less than significant***.

Mitigation Measure(s)

8-1 *In conjunction with the submittal of the Notice of Intent (NOI) to obtain coverage under the Construction General Permit (2012-0006-DWQ), the applicant shall submit a final construction dewatering and groundwater management plan ("Plan") as a component of the SWPPP to the Lahontan Regional Water Quality Control Board and Placer County Department of Environmental Health and the Engineering and Surveying Division for review and approval. The Plan shall identify whether Method 1: Jet Grouting, or Method 2: Vertical Coffer Dams, will be utilized to excavate the underground parking garage. The Dewatering and Groundwater Management Plan must have the following minimum elements:*

- *Location of the discharge area or outfall and name of receiving water;*
- *A description of the discharge or diversion method and plan drawings;*
- *The frequency and estimated volume and rate of discharge;*
- *Planned effluent and/or receiving water monitoring (visual and other);*
- *If discharge to Squaw Creek is proposed, a list of BMPs to be implemented during construction dewatering to ensure that discharge of pumped groundwater will not result in erosive effects to Squaw Creek. This may include but not necessarily be limited to carrying treated groundwater in flexible pipe down to the creek bottom and discharging the water through dewatering bags. Under low flow conditions in the creek, an energy dissipater, such as a washed gravel basin, may be used at the discharge point in Squaw Creek. Under high flow conditions, the filter bags could be floated in the water and discharge would occur into the stream current. The selection of BMPs implemented to ensure that discharge of water will not result in erosive effects to Squaw Creek shall be approved by the Lahontan RWQCB as part of the NPDES permit application; and*
- *If discharge to Squaw Creek is proposed, groundwater screening results shall be provided to determine if the proposed construction dewatering can be covered under the State Construction General*

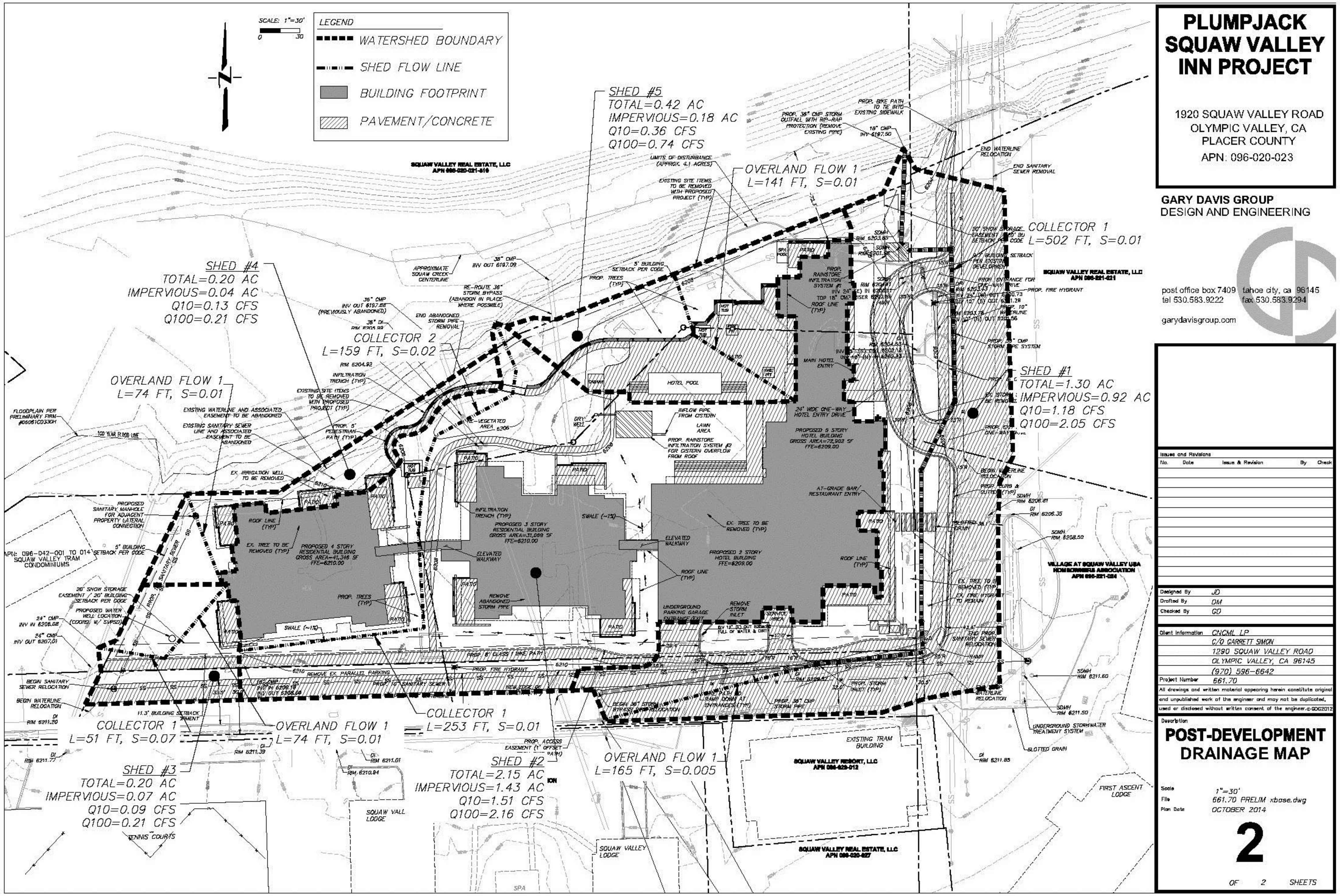
Permit. If the screening determines that residential groundwater contamination does not exist underneath the project site, then the construction dewatering can be covered under the Construction General Permit. If, on the other hand, the screening results indicate that residual groundwater contamination exists, the applicant shall submit a second NOI to the Lahontan RWQCB to obtain additional coverage under the General Permit for Limited Threat Discharges to Surface Waters for the proposed construction dewatering and discharge to Squaw Creek. In conjunction with the NOI for the Limited Threat Discharge Permit, the applicant shall submit a BMP and Monitoring Plan to prevent pollutant discharges to surface waters and ensure compliance with Basin Plan water quality objectives and beneficial uses for Squaw Creek. The BMP Plan shall provide design-level details for an on-site water storage and treatment system, consistent with Appendix A of the Limited Threat Discharge Permit. Appendix A, Best Management Practices Plan, identifies several methods for treatment of pumped groundwater, the following of which would be employed on-site if coverage under this NPDES permit is required: physical filter for solids, dissolved solid or total petroleum hydrocarbons (e.g., dirt bag, filter canister, activated carbon filter, sand filters). Proof of said permit shall be provided to the County.

8-2 Substantially degrade water quality during operations. Based on the analysis below and with implementation of mitigation, the impact is *less than significant*.

Urban runoff is typically associated with impervious surfaces, such as rooftops, streets, and other paved areas, where various types of pollutants may build up and eventually be washed into the storm drain system after storm events. However, according to the Preliminary Drainage Report, and as shown on Figure 8-4, the project will include permanent BMPs, such as Rainstore infiltration systems, a cistern for collecting building roof runoff, infiltration trenches, as well as vegetated areas. Final BMP designs and calculations would be provided with the final drainage report and improvement plans.

More specifically, infiltration trenches will be installed around the residential patios, the rear hotel pool/patio area, as well as the on-site paved pedestrian walkways. The trenches are designed to collect the runoff from these impervious areas before draining off-site and the overflow will be directed away from the structures. The intent is to internally collect the roof runoff from both of the residential buildings, as well as the hotel, and convey the runoff to an underground cistern for irrigation re-use purposes. For calculation purposes, the Preliminary Drainage Report assumed that the cistern will be sized for at least half of the roof runoff with the overflow going into Rainstore infiltration system #2. Therefore, Rainstore system #2 has been sized to accommodate half of the roof runoff. To provide further treatment, the overflow pipe in the Rainstore system will enter into a gravel drywell which will ultimately flow into a relatively flat vegetated area before leaving the site and entering into Squaw Creek.

Figure 8-4
Proposed Drainage Map



The aforementioned series of BMP facilities will treat the majority of the proposed impervious area. The remaining impervious area located in front of the hotel building will be collected by a proposed storm pipe system and conveyed to Rainstore infiltration system #1 located near the hotel entrance off of Squaw Valley Road. The Rainstore system has been sized to adequately provide the necessary storage and infiltration qualities to treat the impervious runoff prior to entering into Squaw Creek.

Because the proposed project would not cause an increase in stormwater runoff and would include water quality treatment prior to discharge from the site, urban pollutants entering and potentially polluting the local water system would not be expected to occur as a result of the proposed project. The current stormwater system design is conceptual in nature, and with implementation of the following mitigation measures, the proposed project would not violate any water quality standards or waste discharge requirements, provide substantial additional sources of polluted runoff, or otherwise substantially degrade water quality during operations, and impacts would be ***less than significant***.

<u>Mitigation Measure(s)</u>

8-2(a) *The Improvement Plans shall include the message details, placement, and locations showing that all storm drain inlets and catch basins within the project area shall be permanently marked/embossed with prohibitive language such as "No Dumping! Flows to Creek." or other language and/or graphical icons to discourage illegal dumping as approved by the Engineering and Surveying Division (ESD). ESD-approved signs and prohibitive language and/or graphical icons, which prohibit illegal dumping, shall be posted at public access points along channels and creeks within the project area. The Property Owners' association is responsible for maintaining the legibility of stamped messages and signs.*

8-2(b) *The Improvement Plans shall show that all stormwater runoff shall be diverted around trash storage areas to minimize contact with pollutants. Trash container areas shall be screened or walled to prevent off-site transport of trash by the forces of water or wind. Trash containers shall not be allowed to leak and must remain covered when not in use.*

8-2(c) *The Improvement Plans shall show that water quality treatment facilities/Best Management Practices (BMPs) shall be designed according to the guidance of the California Stormwater Quality Association Stormwater Best Management Practice Handbooks for Construction, for New Development / Redevelopment, and for Industrial and Commercial (or other similar source as approved by the Engineering and Surveying Division (ESD).*

Storm drainage from on- and off-site impervious surfaces (including roads) shall be collected and routed through specially designed catch basins, vegetated swales, vaults, infiltration basins, water quality basins, *filters, etc. for entrapment of sediment, debris and oils/greases or other identified pollutants, as approved by the Engineering and Surveying Division (ESD). BMPs shall be designed at a minimum in accordance with the Placer County Guidance Document for Volume and Flow-Based Sizing of Permanent Post-Construction Best Management Practices for Stormwater Quality Protection. Post-development (permanent) BMPs for the project include, but are not limited to: soil stabilization, revegetation, Rainstore infiltration systems, cisterns, infiltration trenches and vegetated areas. No water quality facility construction shall be permitted within any identified floodplain or right-of-way, except as authorized by project approvals.*

All BMPs shall be maintained as required to ensure effectiveness. The applicant shall provide for the establishment of vegetation, where specified, by means of proper irrigation. Proof of on-going maintenance, such as contractual evidence, shall be provided to ESD upon request. Maintenance of these facilities shall be provided by the project owners/permittees unless, and until, a County Service Area is created and said facilities are accepted by the County for maintenance. Contractual evidence of a monthly parking lot sweeping and vacuuming, and catch basin cleaning program shall be provided to the ESD upon request. Failure to do so will be grounds for discretionary permit revocation. Prior to Improvement Plan approval, easements shall be created and offered for dedication to the County for maintenance and access to these facilities in anticipation of possible County maintenance.

8-2(d) *This project is located within the permit area covered by Placer County's Small Municipal Separate Storm Sewer System (MS4) Permit (State Water Resources Control Board National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000004, Order No. 2013-0001-DWQ), pursuant to the NPDES Phase II program. Project-related stormwater discharges are subject to all applicable requirements of said permit.*

The project shall implement permanent and operational source control measures as applicable. Source control measures shall be designed for pollutant generating activities or sources consistent with recommendations from the California Stormwater Quality Association (CASQA) Stormwater BMP Handbook for New Development and Redevelopment, or equivalent manual, and shall be shown on the Improvement Plans.

The project is also required to implement Low Impact Development (LID) standards designed to reduce runoff, treat stormwater, and provide baseline hydromodification management to the extent feasible.

8-2(e) *Per the State of California NPDES Phase II MS4 Permit, this project is a Regulated Project that creates and/or replaces 5,000 square feet or more of impervious surface. A final Storm Water Quality Plan (SWQP) shall be submitted, either within the final Drainage Report or as a separate document that identifies how this project will meet the Phase II MS4 permit obligations. Site design measures, source control measures, and Low Impact Development (LID) standards, as necessary, shall be incorporated into the design and shown on the Improvement Plans. In addition, per the Phase II MS4 permit, projects creating and/or replacing one acre or more of impervious surface are also required to demonstrate hydromodification management of stormwater such that post-project runoff is maintained to equal or below pre-project flow rates for the 2 year, 24-hour storm event, generally by way of infiltration, rooftop and impervious area disconnection, bioretention, and other LID measures that result in post-project flows that mimic pre-project conditions.*

8-3 Substantially alter the existing drainage pattern of the site or area, or create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems. Based on the analysis below and with implementation of mitigation, the impact is *less than significant*.

The Preliminary Drainage Report prepared for the project subdivides the project watershed of interest into five drainage areas, labeled SHED #1-5 (see Figure 8-4). Figure 8-4 reflects the drainage conditions associated with the construction of the proposed improvements and illustrates preliminary proposed drainage conditions, including drainage acreage, impervious acreage, 10-year and 100-year peak flows, proposed finished contours, proposed buildings and site features, travel paths of flow, as well as flow path direction and type for each drainage sub-shed.

Similar to the existing condition, the proposed ground surface slopes vary, but are generally towards the north in the direction of existing Squaw Creek and have a grade range throughout the project site from 0.5 percent to 50 percent. The proposed surface types would match the existing with the use of buildings, asphalt, concrete, shrubs, rocks, wood chips, grass turf, and patches of trees. The proposed impervious area for the project site includes the hotel building, the two residential buildings, bike paths, walking paths, entrance/exit drive lanes, and the patio/pool area. According to the watershed summary table included in the drainage report prepared for the proposed project (see Appendix S), the total impervious area is reduced from 2.79 acres in the existing condition to 2.64 acres in the proposed condition.[34]

The existing 36-inch CMP storm pipe that cuts through the site would be relocated around the western portion of the project site, around the proposed buildings, to continue to convey the off-site runoff through the project site and into Squaw Creek. A new 36-

[34] Gary Davis Group. *Preliminary Drainage Report for PlumpJack Squaw Valley Inn* [pg. 5]. July 8, 2014. Revised October 17, 2014.

inch storm water outfall would be installed at the northern boundary of the project site, where an outfall currently exists. The outfall replacement work is evaluated in the Biological Resources section of the Initial Study, attached as Appendix C to this EIR.[35]

Hydrologic Calculations

The existing and proposed watershed maps (see Figure 8-1 and Figure 8-4) indicate the entire watershed within which the project area is contained. The overall existing watershed area is approximately 4.29 acres and the overall proposed watershed area is approximately 4.27 acres. A slight reduction in the overall watershed boundary occurs due to the existing site items, such as the parking lot and sidewalks, that extend to the north outside the property boundary. The existing site items that extend off-site are to be removed as part of the proposed development in that all proposed site items would be contained with the property limits or within County right-of-way. The proposed improvements would restore any disturbed terrain to pre-project or better conditions in terms of vegetative cover and infiltration capacity, and the project would have minimal effect on drainage patterns.[36]

The estimated peak flows for both pre- and post-development conditions at the point of concentration have been calculated using the Placer County Small Watershed Peak Flow Worksheet. The associated peak flows (Q10 and Q100) for the 10-year and 100-year storm event have been determined for a point of concentration immediately downstream of the proposed project area. As the watershed is located in an area that is snow covered for a good portion of the year, the calculations provided evaluate both the "winter" (assumed 90 percent impervious) and "summer" (soil permeability accounted for) conditions.

The total imperious area for the site under summer conditions is reduced in the post-development condition due to the parking lots being removed and a reduction in the on-site pathways and patio coverage. Subsequently, the total 10-year 24-hour flow has a slight reduction from 3.36 cubic feet per second (CFS) under pre-development to 3.27 CFS under post-development conditions, which is a decrease of approximately 0.09 CFS. The peak flows calculated using the Small Watershed Peak Flow Worksheet did not take into account the proposed BMP and infiltration systems that are being installed with the site improvements. Therefore, the actual peak flow reduction would be greater when considering the permanent BMP facilities such as the proposed cistern, Rainstore

[35] As discussed on page 22 of the IS, due to the required storm pipe system improvements related to the proposed project, an existing 18-inch cmp culvert, which outfalls off-site into Squaw Creek, will be replaced during the dry season (between approximately May 1 and October 15). The existing culvert will be replaced by a 36" cmp culvert. In order to limit the amount of off-site disturbance, the proposed culvert will have the same alignment and invert as the existing culvert. Furthermore, the proposed culvert will have the same off-site encroachment as the existing culvert. This improvement may result in impacts to habitat under the jurisdiction of the California Department of Fish and Wildlife and the U.S. Army Corps of Engineers. As a result, the IS includes mitigation measures IV-4(a) through IV-4(c) to ensure that any adverse habitat effects are reduced to a less-than-significant level.

[36] Gary Davis Group. *Preliminary Drainage Report for PlumpJack Squaw Valley Inn* [pg. 5]. July 8, 2014. Revised October 17, 2014.

infiltrators, and infiltration trenches. Final BMP computations would be provided in detail with the improvement plans and final drainage report.

Infiltration trenches would be installed around the residential patios, the rear hotel pool/patio area, as well as the on-site paved pedestrian walkways. The trenches are designed to collect the runoff from these impervious areas before the runoff drains off-site and the overflow would be directed away from the structures. The intent is to internally collect the roof runoff from both of the residential buildings, as well as the hotel, and convey the runoff to an underground cistern for irrigation re-use purposes. For calculation purposes, the cistern was assumed to be sized for at least half of the roof runoff with the overflow going into Rainstore infiltration system #2. Therefore, Rainstore system #2 has been sized to accommodate half of the roof runoff. To provide further treatment, the overflow pipe in the Rainstore system would enter into a gravel drywell which would ultimately flow into a relatively flat vegetated area before leaving the site and entering into Squaw Creek. The BMP facilities would treat the majority of the proposed impervious area. The remaining impervious area located in front of the hotel building would be collected by a proposed storm pipe system and conveyed to Rainstore infiltration system #1 located near the hotel entrance off of Squaw Valley Road. The Rainstore system #1 has been sized to adequately provide the necessary storage and infiltration qualities to treat the impervious runoff prior to entering into Squaw Creek.[37]

Overland Release

In the event that all storm sewer systems are blocked, all storm runoff could be conveyed by swales, curb and gutter, and surface sheet flow away from the buildings and facilities. Under the proposed conditions, overland release would continue to discharge flow north around the buildings and enter Squaw Creek, similar to current conditions. The proposed surface grades surrounding the new buildings and facilities slope away from the structures to safely convey the runoff around the building structures to prevent flooding and provide proper overland release. All of the overland flow would be conveyed to Squaw Creek as in the existing condition. Given the reduction in overall impervious surface area (reduced from 2.79 acres in the existing condition to 2.64 acres in the proposed condition), overland flow would be proportionately reduced compared to existing conditions.

Conclusion

According to the Preliminary Drainage Report prepared for the proposed project, under post-development conditions, the proposed drainage and BMP improvements will ensure that adverse drainage impacts would not occur on surrounding properties, or Squaw Creek.[38] After implementation of the mitigation measure set forth below including

[37] Gary Davis Group. *Preliminary Drainage Report for PlumpJack Squaw Valley Inn* [pg. 6]. July 8, 2014. Revised October 17, 2014.
[38] Gary Davis Group. *Preliminary Drainage Report for PlumpJack Squaw Valley Inn* [pg. 8]. July 8, 2014. Revised October 17, 2014.

requirements relating to the design of the storm drain system, the storm drain system will have sufficient capacity to ensure capacity is sufficient for the proposed project. As a result, after implementation of mitigation the impact is ***less than significant***.

Mitigation Measure(s)

8-3(a) *As part of the improvement plan submittal process, the preliminary Drainage Report provided during environmental review shall be submitted in final format. The final Drainage Report may require more detail than that provided in the preliminary report, and will be reviewed in concert with the improvement plans to confirm conformity between the two. The report shall be prepared by a Registered Civil Engineer and shall, at a minimum, include: A written text addressing existing conditions, the effects of the proposed improvements, all appropriate calculations, watershed maps, changes in flows and patterns, and proposed on- and off-site improvements and drainage easements to accommodate flows from this project. The report shall identify water quality protection features and methods to be used during construction, as well as long-term post-construction water quality measures. The final Drainage Report shall be prepared in conformance with the requirements of Section 5 of the Land Development Manual and the Placer County Storm Water Management Manual that are in effect at the time of improvement plan submittal.*

8-3(b) *The Improvement Plan submittal and Final Drainage Report shall provide details showing that storm water run-off shall be reduced to pre-project conditions through the installation of retention/detention facilities. Retention/detention facilities shall be designed in accordance with the requirements of the Placer County Storm Water Management Manual that are in effect at the time of submittal, and to the satisfaction of the Engineering and Surveying Division (ESD) and shall be shown on the Improvement Plans. The ESD may, after review of the project final drainage report, delete this requirement if it is determined that drainage conditions do not warrant installation of this type of facility. In the event on-site detention requirements are waived, this project may be subject to payment of any in-lieu fees payable prior to Improvement Plan approval as prescribed by County Ordinance. Maintenance of detention facilities by the homeowner's association, property owner's association, property owner, or entity responsible for project maintenance shall be required. No retention/detention facility construction shall be permitted within any identified wetlands area, floodplain, or right-of-way, except as authorized by project approvals.*

8-4 Substantially deplete groundwater supplies or interfere substantially with groundwater recharge. Based on the analysis below, the impact is *less than significant*.

Short-Term Aquifer Impacts

The short-term effect of dewatering operations on the aquifer would be proportional to the ratio of the volume of groundwater pumped to the groundwater storage in the aquifer. If the sheet pile method of shoring the excavation is used (i.e., Method 2), about 148 acre-feet of water would be pumped from the aquifer. Aquifer storage is estimated to range from about 3,600 to about 4,600 acre-feet.[39] Dewatering would thus result in a one-time withdrawal of about three to four percent of total aquifer storage. Given the consistent seasonal recharge of the aquifer demonstrated by consistent annual groundwater elevation recovery universally observed in numerous wells during the winter following dry-season depletion,[40] the short-term depletion of groundwater would be expected to be replaced in the following winter without significant effects. If the grouting method is used for shoring the excavation, groundwater withdrawals of about 1.2 acre-feet (a one-time withdrawal of less than 0.1 percent of total aquifer storage) would have virtually no effect on the aquifer.

Long-Term Aquifer Impacts

In the long-term, the foundations of the structure will extend beneath the seasonal water table and will incrementally reduce long-term aquifer storage. The significance of this can best be determined by considering the ratio of reduced aquifer storage volume to total aquifer storage volume. If the grouting method is used (Method 1), a slightly larger volume of the aquifer will be lost to the new building foundation. Per Holdrege & Kull's Supplement No. 2 analysis, the volume would range between 2.6 and 3.75 acre-feet, depending on the assumption used regarding the average long-term water table elevation.[41] The HydroMetrics WRI Technical Memorandum, dated March 15, 2016, concurred with Holdrege & Kull's representation of average water table elevations. If the vertical coffer dam method is used (Method 2), Holdrege & Kull has estimated that the volume of aquifer loss would range between 1.16 and 2.31 acre-feet.

The 2.6 to 3.75 acre-feet of lost groundwater storage represents at most 0.1 percent (greatest estimate of lost aquifer storage of 3.75 acre-feet divided by smallest estimate of total aquifer storage of 3,600 acre-feet of the total aquifer storage: 3.75 acre-feet/3,600

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39 Todd Engineers. *Independent Analysis of Groundwater Supply Olympic Valley Groundwater Basin* [Tables 3-1, 3-2 and 3-3]. December 2012.

40 HydroMetrics WRI. *Squaw Valley Creek/Aquifer Study Model Update Report* [pp. 31 and 34-36]. November 2013.

41 Holdrege & Kull, *Hydrogeologic and Groundwater Management Report Supplement No. 2* [pg. 4]. February 12, 2016. Based on the maximum grout cofferdam area of 83,860 square feet, a bottom elevation of 6,187 feet (for Method 1 – see Figure 8-3), and the maximum groundwater level of 6,200 feet, the displaced groundwater would be approximately 1.2 million gallons or 3.75 acre-feet. Using a more likely groundwater elevation of 6,196 feet, the displaced water would be approximately 850,000 gallons or 2.6 acre-feet.

acre-feet = 0.00104, or 0.104%).[42] From 1993 to 2011, groundwater use rates in Squaw Valley ranged from about 600 to 750 acre-feet per year; lost aquifer storage represents at most about 0.6 percent of annual groundwater use (3.75 acre-feet/600 acre-feet = 0.00625, or 0.625%). Quantitatively, the volume of lost aquifer is very small relative to both aquifer volume and annual groundwater use so that in even the simplest conceptualization of the groundwater system a significant decline in the quantity or quality of usable groundwater in the aquifer would not occur.[43]

Qualitative aspects of groundwater recharge processes should also be considered in analyzing potential effects of the loss of a small volume of aquifer at upper surface of the aquifer. The aquifer underlying Squaw Valley is recharged by rainfall and snowmelt over a very broad area along the valley margins and from fracture flow in underlying bedrock, on the valley surface, and through stream channels traversing the valley. The fact that the project could marginally reduce the volume of aquifer storage will not affect the overall groundwater recharge process in Squaw Valley.

The large amount of rainfall and snowmelt that is the source of groundwater recharge is much greater than the amount of recharge that occurs. During the peak of the snowmelt season when stream flow is highest and inputs of new water to the aquifer are greatest, recharge rates are likely to be limited by the infiltration capacity of the soil and the percolation rate to groundwater, and much water entering the soil surface may be ex-filtrated from the soil and returned to the surface. During the period of peak recharge, the hydrologic system is essentially saturated and recharge rates are limited by infiltration and percolation rates of the alluvial sediment of the valley. The annual recovery of groundwater elevations observed in wells in Squaw Valley following annual dry-season depletion is strong evidence of the resilient and robust character of aquifer recharge. Finally, annual groundwater pumping lowers the water table and creates additional storage space in the aquifer, essentially causing an overall increase in long-term groundwater recharge rates. Annual groundwater pumping rates of 600 to 750 acre-feet per year through 2011 indicate a comparable amount of groundwater recharge that occurs because of annual aquifer drawdown by groundwater pumping. The volume of aquifer storage space created by groundwater pumping offsets by a very large margin the increment of storage volume estimated to be lost due to the depth of the foundations of the PlumpJack parking garage. In the managed aquifer system, the aquifer volume lost to the PlumpJack project is insignificant with respect to the amount of groundwater storage and will not reduce the availability of groundwater. Such a loss of aquifer storage does not represent a potential significant impact on groundwater resources in Squaw Valley.[44]

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[42] The estimate of aquifer storage is from Tables 3-1 through 3-3 of Todd Engineers *Independent Analysis of Groundwater Supply, Olympic Valley Groundwater Basin*, dated December 2012. The aquifer storage capacity estimates provided in these tables generally ranges from approximately 3,600 to 4,600 acre-feet.

[43] O'Connor Environmental. *Hydrogeologic Peer Review of New and Revised Analyses of the Proposed PlumpJack Hotel, Squaw Valley, California*. [pg. 4]. March 25, 2016.

[44] O'Connor Environmental. *Hydrogeologic Peer Review of New and Revised Analyses of the Proposed PlumpJack Hotel, Squaw Valley, California* [pg. 4]. March 25, 2016.

Groundwater Flow Interruption

A groundwater flow analysis was performed for the project, assuming implementation of Method 1: Jet Grouting, for conservative analysis purposes (i.e., this method of constructing the underground garage would result in the greatest depth of penetration into the underlying aquifer). As shown in Figure 8-3, the grout barrier would extend to a depth of approximately 23 feet below the ground surface, at an approximate elevation of 6,187 feet, which is five feet below the proposed excavation limit of 6,192 feet. Figure 8-5 and Figure 8-6 show the approximate structure location with pre-construction and post-construction groundwater flow directions and gradients, respectively.

The groundwater flow is highest in the winter and is generally from the aquifer to the creek, or from south to north. Where groundwater flow encounters the building (i.e., underground parking garage), the groundwater would flow around and under the building to the creek. The modelling performed by Holdrege & Kull, using the SLIDE 5.0 software, shows that the structure and bottom grout barrier influence on groundwater would be relatively small.[45]

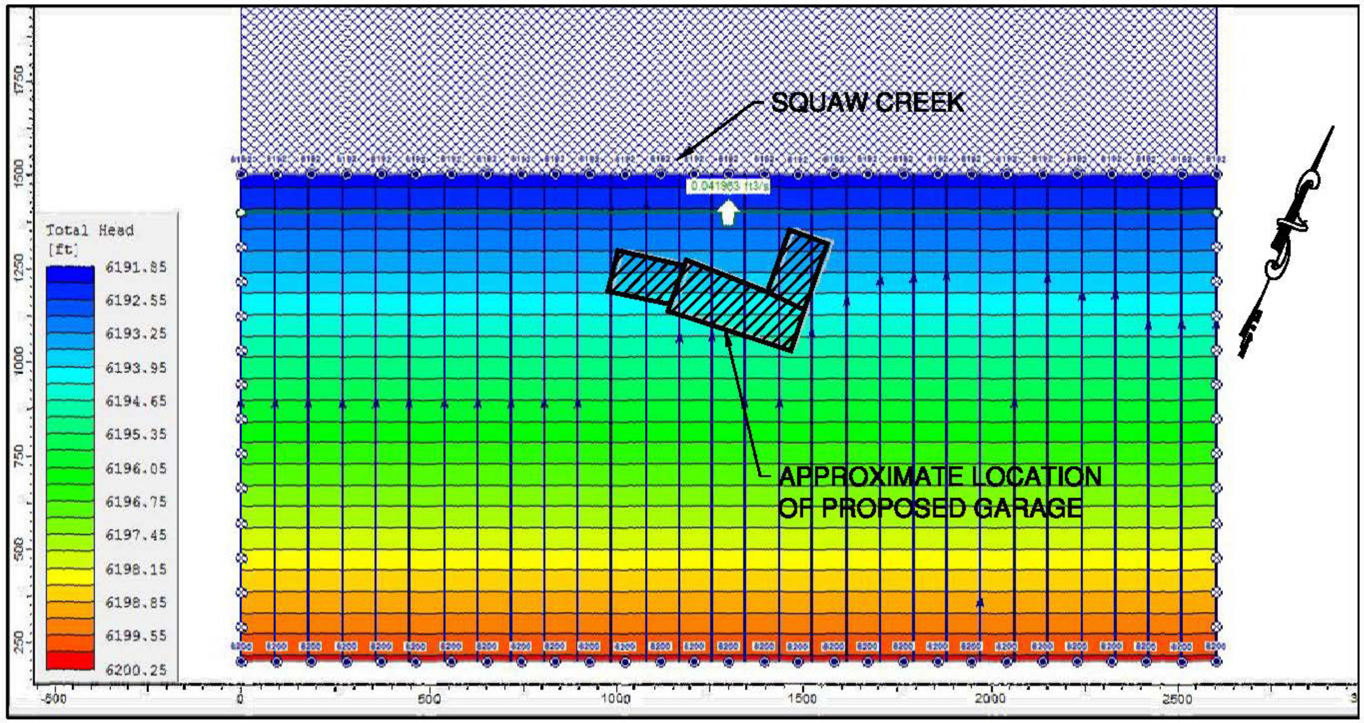
A very small rise in elevation head (less than 1-foot) would likely occur on the up-gradient side of the building, but the water would slightly increase in velocity as it flows around the building and into the creek. The velocity of groundwater flow is approximately 235 feet per day. A slight increase in velocity would be insignificant and would not induce erosion or have other adverse effects to the creek. Hence, the same volume of water would flow to the creek after the structure is built as before construction.

Potential Effects of Below-ground Construction on Streamflow

The following discussion pertains to Method 2: Vertical Coffer Dams, as the method represents a conservative analysis of potential effects to streamflow during excavation of the underground parking garage. Using vertical hydraulic conductivity of 15 ft/day, Holdrege & Kull has estimated the rates of groundwater discharge from the excavation area, using Method 2, as follows: 0.25 cfs (160,000 gallons per day) for the period April 30 through May 31, 0.40 cfs (261,000 gallons per day) for the period June 1 through July 15, and 0.53 cfs (344,000 gallons per day) for the period July 16 through October 15. The total estimated volume of groundwater pumped from the excavation would accordingly be about 148 acre-feet in this scenario.

[45] Holdrege & Kull, *Hydrogeologic and Groundwater Management Report Supplement No. 2* [pg. 6]. February 12, 2016.

Figure 8-5
Pre-Construction Groundwater Flow



Notes:
1. The pre-construction groundwater two-dimensional flow net was prepared using the computer program SLIDE 5.0.
2. The soil was assumed to be homogenious with an isotropic permeability of approximately 235 Ft./Day.
3. A constant head flow boundary with an total head of 6192 feet msl was assumed for Squaw Creek. A constant head flow boundary with a total head of 6200 feet msl was assumed at distance of 800 feet upgradient from the south side of the completed garage structure (i.e., cofferdam). No flow boundaries were assumed at distances of 1000 feet both upstream and downstream, relative to the Squaw Creek alignment, from the west and east sides of the completed garage structure.

SCALE
400 Feet 0 400 800
1 Inch 0

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Truckee, California, 96161
PH: 530-587-5156, FAX: 530-587-5196

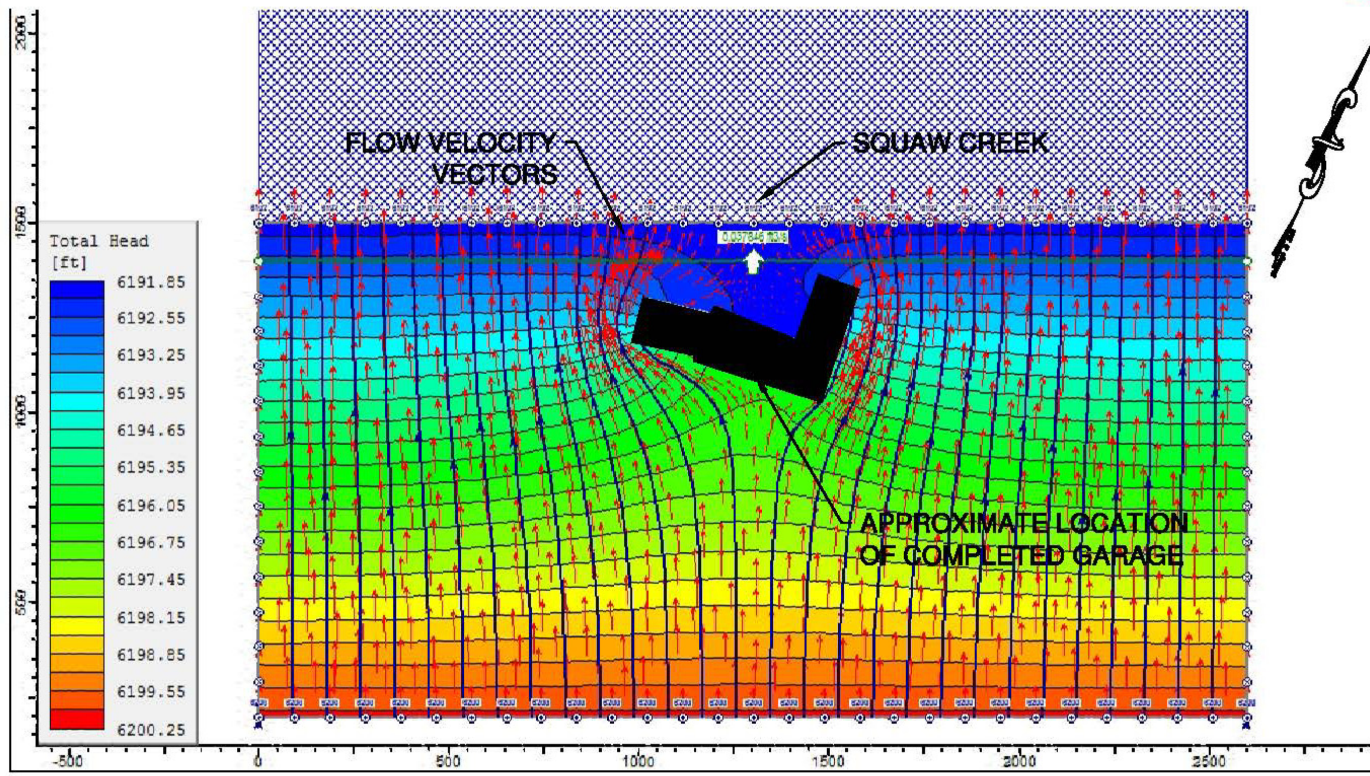
PRE-CONSTRUCTION
PLAN VIEW FLOW NET
Plumpjack Squaw Valley Inn
1920 Squaw Valley Road
Olympic Valley, Placer County, California

DRAWN BY:	DMO
CHECKED BY:	JKH
PROJ. NO.:	41905–05
DATE:	01–05–16

FIGURE NO.: 3

41905–05_16–0212_FIG–3_AutoCAD 2010.DWG
DMO_15–1031

Figure 8-6
Post-Construction Groundwater Flow



Notes:
1. The post-construction groundwater two-dimensional flow net was prepared using the computer program SLIDE 5.0.
2. The soil was assumed to be homogenlous with an isotropic permeability of approximately 235 Ft./Day.
3. A constant head flow boundary with an total head of 6192 feet msl was assumed for Squaw Creek. A constant head flow boundary with a total head of 6200 feet msl was assumed at distance of 800 feet upgradient from the south side of the completed garage structure (i.e., cofferdam). No flow boundaries were assumed at distances of 1000 feet both upstream and downstream, relative to the Squaw Creek alignment, from the west and east sides of the completed garage structure.

SCALE
400 Feet 0 400 800
1 Inch 0

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POST-CONSTRUCTION
PLAN VIEW FLOW NET
Plumpjack Squaw Valley Inn
1920 Squaw Valley Road
Olympic Valley, Placer County, California

DRAWN BY:	DMO
CHECKED BY:	JKH
PROJ. NO.:	41905-05
DATE:	01-08-16

FIGURE NO.:
4

41905-05_16-0212_FIG-4_AutoCAD 2010.DWG

DMO_15-1031

Discharge to Squaw Creek from groundwater in the month of May would occur when stream flow remains relatively high (> 50 cfs)[46], and the increment of about 0.25 cfs of additional flow would not appreciably affect Squaw Creek flow conditions. During the period June 1 to July 15, Squaw Creek flows typically begin to decline substantially owing to the gradual depletion of the snow pack and corresponding reduction in stream flow. As stream flow declines to less than 5 cfs or lower near July 15, the additional increment of 0.40 cfs discharged from groundwater would become increasingly substantial. Nevertheless, the small quantity of flow that might be discharged would not significantly affect the dominant characteristic of diminishing stream flow to near zero in the period leading up to mid-July. When groundwater pumping from the excavation would be at its greatest (0.53 cfs), from July 16 to October 15, streamflow in Squaw Creek is normally very low or absent. In general, Squaw Creek is expected to be losing surface flow to groundwater in the west end of the valley based on the analysis of seepage rates in Squaw Creek during the period of very low stream discharge during the summer. If discharge of 0.53 cfs occurred during summer and fall, surface flows would probably be maintained at a somewhat greater level for a longer duration over a greater distance downstream. However, the low magnitude of discharge would not substantially alter the characteristics of this reach of Squaw Creek at this time of year, with very low rates of surface flow and net transfer of water from the stream to groundwater. Discharge of groundwater to Squaw Creek at rates of about 0.5 cfs or less is not expected to have significant impacts on the creek or the aquifer, and would occur at a location and with flow rate that would normally occur during mid-summer near the point in time when surface flows in Squaw Creek normally cease or are reduced to very low volumes.[47]

Dewatering Method 1 is described in detail in the Holdrege & Kull Hydrogeologic and Groundwater Management Report Supplement No. 2 (February 12, 2016) and by davisREED Construction (January 20, 2016; attached to H&K February 12, 2016). This approach to construction seals the excavation with grout, including the floor of the excavation. Although this technique enlarges somewhat the effective volume of the excavation below the water table, the technique is expected to reduce seepage into the excavation to negligible rates (1 to 2 gpm). Consequently, the dewatering operation is required only to extract groundwater stored in the soil to be excavated during the late summer (between September 1 and October 15) when the water table elevation will be at its seasonal minimum. The extracted volume of water would total about 1.2 acre-feet (376,000 gallons). The dewatering is expected to occur over a period of 10 days or fewer, suggesting that pumping rates would be on the order of 25 to 50 gallons per minute or about 0.06 to 0.12 cfs. These volumes of water, if discharged to Squaw Creek, would occur at a location and with a flow rate that would normally occur during mid- to late-summer near the point in time when surface flows in Squaw Creek normally cease or are reduced to very low volumes. It is not unlikely that flows of about 0.1 cfs would re-infiltrate the water table through the streambed over a distance of about one thousand feet with no adverse effects. Measurements of seepage rates in Squaw Creek by HydroMetrics

[46] HydroMetrics WRI. *Technical Memorandum on Seasonal Creek/Aquifer Interactions* [pg. 39]. November 2013.
[47] O'Connor Environmental. *Hydrogeologic Peer Review of New and Revised Analyses of the Proposed PlumpJack Hotel, Squaw Valley, California* [pg. 3]. March 25, 2016.

WRI found seepage rates of this magnitude in a losing reach of Squaw Creek located about one to two thousand feet downstream of the PlumpJack site.[48]

Impacts of PlumpJack Well Pumping

Figure 8-7 shows pumping from the proposed PlumpJack well that was simulated in the current model in orange bars, and the estimated total PlumpJack demand in grey bars. As shown in the figure, the pumping assigned to the PlumpJack well in the current model exceeds the estimated water demand associated with the proposed renovation. Therefore, the current model will conservatively overestimate impacts of PlumpJack pumping on Squaw Creek.

The total estimated demands shown in Figure 8-7 include the estimated irrigation demand of approximately 3.3 million gallons per year. Of this demand, 2.9 million gallons was distributed equally across the summer months of May through October, and 420,000 gallons were distributed to the hottest months of July-September.

Two versions of the current model were run to evaluate pumping from the proposed PlumpJack well locations, one model with pumping at Location 1, and one model with pumping at Location 2. Figure 8-8 shows both proposed well locations used in the models. In each model, additional pumping occurred only at Location 1 or Location 2, not simultaneously at both well locations.

PlumpJack pumping impacts were assessed at two locations, referred to here as observation points, adjacent to the proposed well locations. The observation points measure simulated creek flows at the closest stream locations adjacent to both well Location 1 and well Location 2. The location of the stream observation points used for the proposed project's evaluation are shown in Figure 8-8. The effects of additional pumping from the proposed PlumpJack well were evaluated by comparing streamflows with PlumpJack pumping at either Location 1 or Location 2 with streamflows from the baseline model, where simulated pumping at the PlumpJack property was not assumed.

The difference between the baseline streamflow and the simulated streamflow with the addition of pumping at PlumpJack is referred to as the net pumping impact. For each observation point, the streamflow reduction due to pumping is compared to the baseline streamflow. The streamflow reduction from pumping is also evaluated as a percentage of baseline streamflow.

[48] HydroMetrics WRI. *Technical Memorandum on Seasonal Creek/Aquifer Interactions* [Tables 6 and 7, pg. 19-20]. November 2013.

Figure 8-7
Simulated PlumpJack Well Demand Comparison

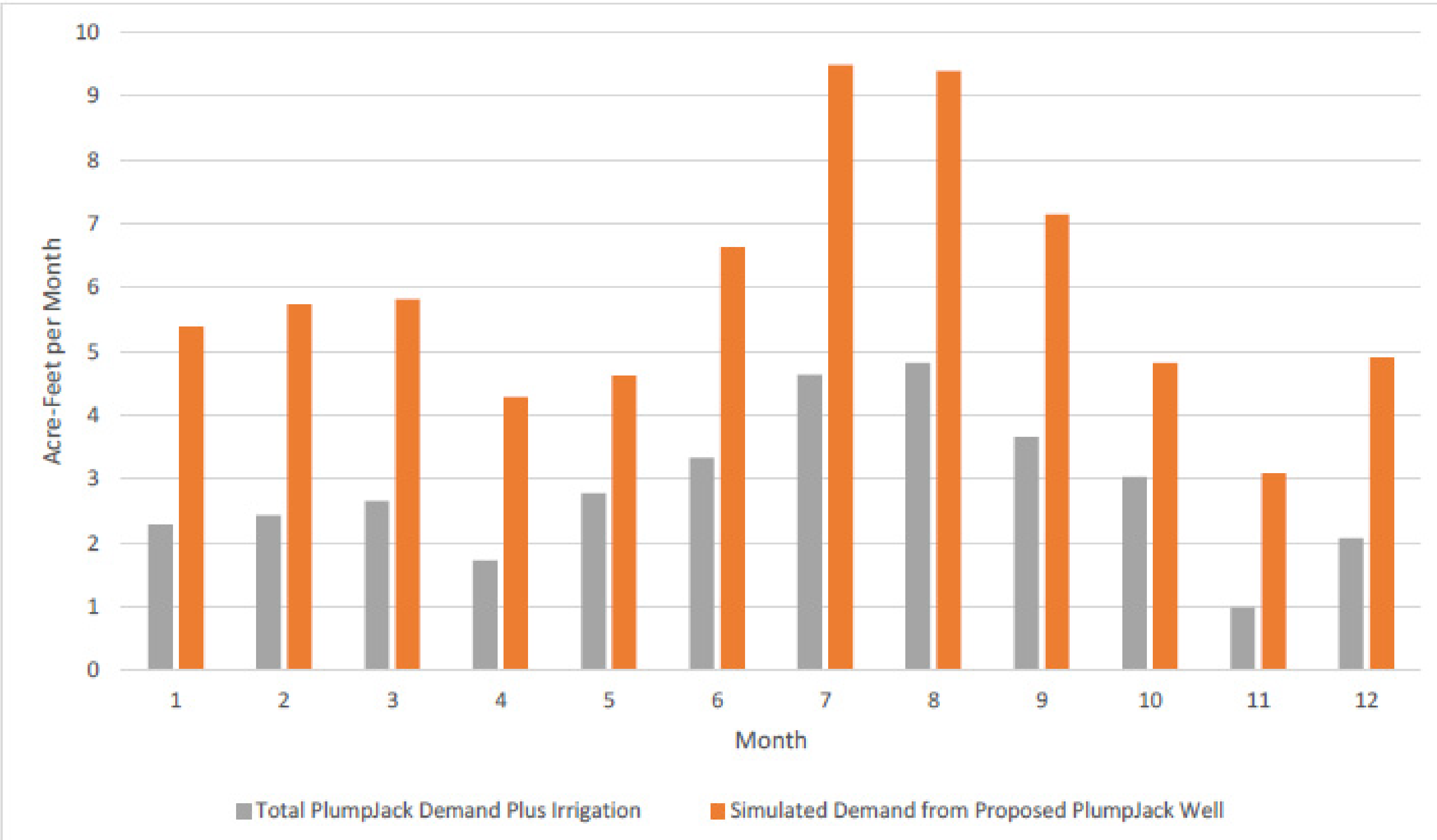
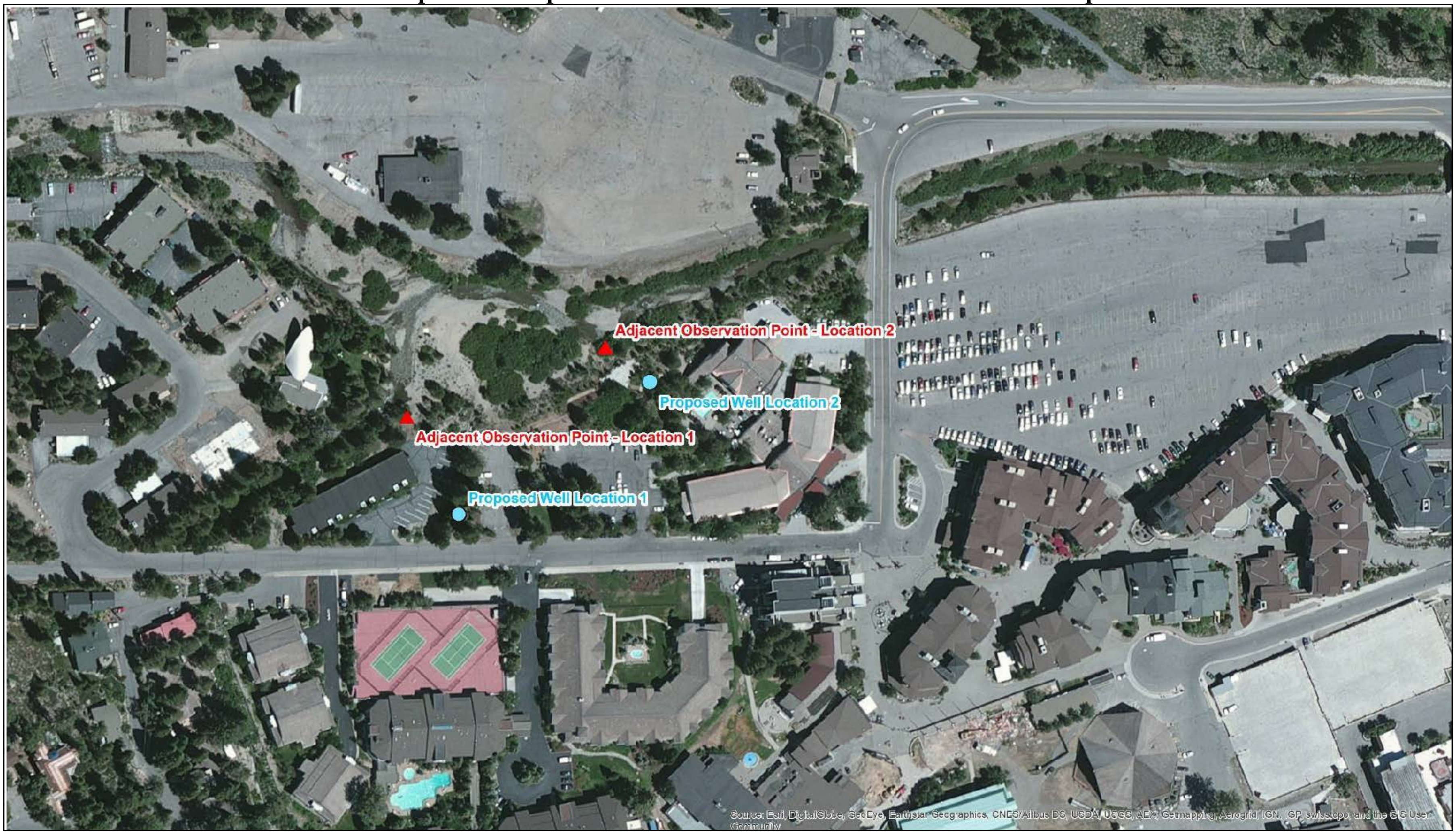


Figure 8-8
Proposed PlumpJack Well and Model Observation Location Map



Source: HydroMetrics. Proposed PlumpJack Well Impact Analysis, March 11, 2016.

The net pumping impact from Location 1 is very small; even the largest streamflow reductions from pumping are not readily observable at the scale of this plot. The reduction in streamflow from pumping at Location 1 ranges from 0.000 to 0.001 cubic feet per second (cfs); while the total streamflow ranges from 0 to over 50 cfs. The maximum net pumping impact, therefore, represents less than 0.02 percent of the average baseline streamflow at this location.

As in the simulation of Location 1 pumping, the streamflow reduction from pumping at Location 2 is very small and not readily observable at this scale. The reduction in streamflow from pumping at Location 2 ranged from 0.0 to 0.4 cfs; while the total streamflow ranges from 0 to over 240 cfs. The maximum net pumping impact, therefore, represents less than two percent of the average baseline streamflow at this location.

The analysis indicates that pumping from either of the proposed PlumpJack well locations produces a decline in streamflow in Squaw Creek that is small compared to the seasonally high streamflows in the creek. Pumping from proposed well Location 1 never produces a streamflow reduction that is a significant portion of the total streamflow. Pumping from proposed well Location 2 can seasonally produce a streamflow reduction that is a significant portion of total streamflow. However, this only occurs in summer months when observed streamflow in Squaw Creek is also very low. The net pumping impacts during the summer months are only large in proportion to already small seasonal streamflows. The greatest net pumping impact occurs when streamflow is less than 0.5 cfs, which is very low compared to winter streamflow.

Moreover, for either location, the effect of the estimated reduction in streamflow must be considered in the context of seasonal fluctuations in streamflow where in late summer and fall, streamflow ceases due to natural seasonal decline in the water table. The project would not significantly affect the pattern of seasonal flows in Squaw Creek. At most, for Location 2, the small reduction in streamflow caused by a new PlumpJack well would marginally affect the timing of cessation of flow locally in Squaw Creek. It is unlikely that these effects would be distinguishable from natural variability of the spatial and temporal variability of flow in Squaw Creek. These potential effects on streamflow will not be significant with respect to the overall hydrology of Squaw Creek with respect to either surface flows or groundwater.[49]

<u>Conclusion</u>

The above analysis demonstrates that the construction of the underground parking garage would not result in significant adverse short- and long-term aquifer effects associated with construction dewatering and loss of aquifer storage volume, respectively. In addition, the analysis found that the underground parking garage would not result in adverse effects associated with groundwater flow interruption, nor depletion of streamflow. As a result, the above analysis supports the conclusion that the proposed

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[49] O'Connor Environmental. *Hydrogeologic Peer Review of New and Revised Analyses of the Proposed PlumpJack Hotel, Squaw Valley, California* [pg. 5]. March 25, 2016.

project would result in a ***less-than-significant*** impact with respect to substantially depleting groundwater supplies or interfering substantially with groundwater recharge.

Mitigation Measure(s)
None required.